a journal for precision engineers and all users of industrial diamonds and other hard materials

INDUSTRIAL DIAMOND REVIEW

incorporating INDUSTRIAL DIAMOND ABSTRACTS

D. S. I. R.
National Lending Library for Science and Technology.

MONTHLY 1/3 SUBSCRIPTION 15/- A YEAR

July, 1961 Vol. 21 No. 248

1961 21 (248) - (253)

4450

NATIONAL ENGINEERING LABORATORY
31 JUL 1961
LIBRARY.

AUSTRALIA
BENELUX
BRAZIL
BRITISH GUIANA
CANADA
FRANCE
GREAT BRITAIN
INDIA
ITALY
JAPAN
NEW ZEALAND
SCANDINAVIA
SPAIN
SWITZERLAND

Triefus

INDUSTRIAL DIAMONDS
TRIEFUS & CO. LTD.,
THAVIES INN HOUSE, 4, HOLBORN CIRCUS,
LONDON, E.C.1, ENGLAND
Telephone : FLEet Street 9741 Cables : Triefus, London

DIAMOND PRODUCTS
TRIEFUS INDUSTRIES LTD.,
MANOR ROYAL, CRAWLEY, SUSSEX, ENGLAND
Telephone : Crawley 2244 Cables : Triefus, Crawley
DRILL BITS · DIAMOND TOOLS
DIAMOND MICRO-POWDERS

INDUSTRIAL DIAMOND COMPANY (SALES) LTD.

INDUSTRIAL DIAMONDS FOR ALL APPLICATIONS

DIAMOND POWDER

- We offer a 24 hour delivery service
- Our prices are highly competitive and credit facilities are available

ENQUIRIES INVITED

88/90 HATTON GARDEN · LONDON · E.C.1

Telephone: HOLBORN 2642/2247 *Telegrams:* IDECE, LONDO

The JKS "Wheelmaster"

discounts high dressing costs

You will find the "Wheelmaster" can substantially reduce diamond cost in the dressing of wide face and large diameter wheels. The eight stones are chosen specially for such work. They can be completely consumed without resetting. Matrices available to suit all brands of wheel.

Telephone:
★HOLborn 6451

J. K. SMIT & SONS Diamond Tools LTD.

22-24 Ely Place, Holborn Circus, London, E.C.1.

2, St. John Street, Deansgate, MANCHESTER. 14, Queens Road, COVENTRY. Works: Colwyn Bay, N. Wales.

Also at Murray Hill, New Jersey, U.S.A . CANADA . HOLLAND FRANCE AUSTRALIA

DIAMANT BOART

DIAMOND IMPREGNATED TOOLS
ARE USED ALL OVER THE WORLD

Wheels

Saws

Drill Bits

Truing and dressing tools ∴ Hones Boring Crowns
Dental Tools

74, avenue du Pont de Luttre, Brussels, Belgium

Sole representative in U.K.: **F. Yorke & Partners Ltd, Lassell Street, Greenwich London, S.E.10**

DIAMOND TECHNOLOGY

by Paul Grodzinski

800 pages: 500 illustrations: 94 tables.

CHAPTERS

Chapter 1—Technology of Machining Methods.
Chapter 2—Dividing Diamonds and Gem Stones.
Chapter 3—Bruting.
Chapter 4—General Survey of Grinding and Polishing.
Chapter 5—Grinding and Polishing Gem Stones.
Chapter 6—Grinding and Polishing Diamond.
Chapter 7—Drilling and Boring Holes.
Chapter 8—Carving and Engraving.
Chapter 9—Diamond Powder—Its Production and Use.
Chapter 10—Polishing Gem Stones for Jewellery.
Chapter 11—Manufacture of Watch and Instrument Jewels.
Chapter 12—Manufacture of Diamond and Sintered Carbide Dies.
Chapter 13—Industrial Diamonds, Selection and Orientation.
Chapter 14—Setting Diamonds in Tools.
Chapter 15—Grinding and Lapping Sintered Carbides.
Chapter 16—Production of Piezo-Electric and Optical Crystals. Bibliography. Appendix.

From your Booksellers or the Publishers. Price 52/6d, by post 55/-

N.A.G. PRESS, LTD., 226, LATYMER COURT, LONDON W.6.

$10 in U.S.A. and CANADA, distributed in U.S.A. and CANADA
by Huebner Publications Inc., 1975, Lee Road, Cleveland, Ohio.

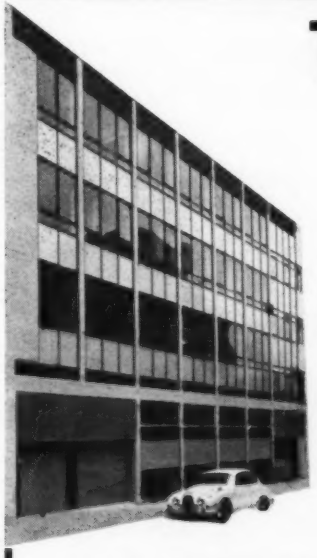
Exporters

WOLVERHAMPTON
DIAMOND DIE
& TOOL CO. LTD.

ALL GRADES OF
BOARTS AND INDUSTRIAL DIAMONDS

11 HATTON GARDEN LONDON E.C.1

TELEPHONE HOLBORN 3017 CABLE PARDIMON LONDON



The Diamond Tool people

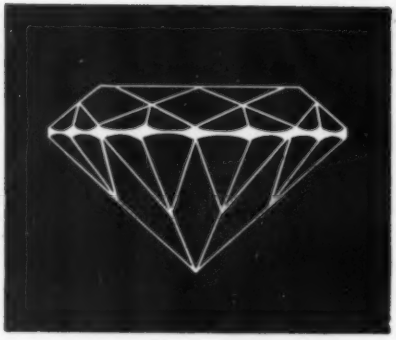
have now moved to our own office block, in the heart of London's diamond industry. This means a better than ever service for you and all your diamond tool and wheel requirements.
Industrial diamonds may look alike, but there is a vast difference between the good and mediocre which only a diamond expert can see. You have to trust your diamond tool supplier because it is on his integrity and experience that your diamond tools depend.
Indusmond is one of a group of companies who have worked in diamonds for as many as ninety years, and have been making diamond tools for twenty years. During this period Indusmond have established a reputation for high quality and perfection that is second to none.
Try Indusmond tools next time—you can trust them!

Wheel Dressing Diamond Tools. Shaped and Polished Diamond Tools. Hardness Diamond Tools. Diamond Impregnated Wheels and Laps. Diamond Impregnated Drills and Saws.
Call and see us at Memfagimal House, 26-29 St. Cross Street, Hatton Garden, London, E.C.1.—you'll be made very welcome.

indusmond
DIAMOND TOOLS

Telephone: CHAncery 7608

Selected rough diamonds and
specially graded diamond powders

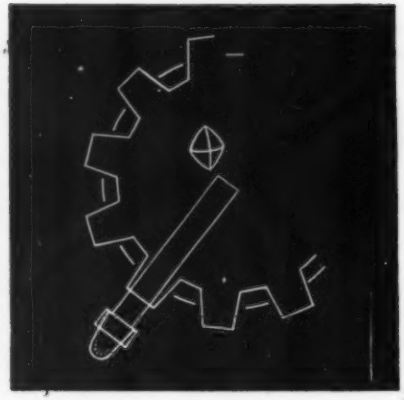


d. drukker & zn. n.v.

specialists in sorting & cleaving

Our new method of diamond sorting will give you new possibilities to get the right materials for the right job.

diamond in art and industry



We present you our private exhibition covering the industrial and the artistic use of diamonds.

If you are interested in our products please visit our works.

amsterdam - holland

12 sarphatikade

phone: 67321

gems - industrials - powder - tools
ask for our new export plan

CORRECTION

Please use the attached to cover the Contents List of the June Issue.

Generally Speaking	**Adamant**	**105**
Application of Industrial Diamond V	**H. J. Otterloo**	**106**
An Optical Profile Grinder		**118**

July

Gen
Appl

Phys
I

How

Indus
Is 3d
and b
post
Amer
usual
publi

Cont
inter
sibili
drawi
Mater

All

Mar

INDUSTRIAL DIAMOND REVIEW

Vol 21 No 248
July 1961

Editor-in-Chief :
Eric M. Bruton

Managing Editor :
Patrick Greene

★

© 1961 *N.A.G. Press Ltd.—All rights reserved.*

PRINCIPAL CONTENTS

Generally Speaking — **Adamant** 125

Application of Industrial Diamonds VI — **H. J. Otterloo** 126

Physical Mechanics — **Robert Courtel and Edmond Mencarelli** 133

How to Finish Flame-Plated Coatings — **M. A. Teter** 136

★

Industrial Diamond Review is published monthly at 1s 3d per copy, and is obtainable through newsagents and booksellers or by postal subscription (15s yearly, post free). Subscriptions in the United States of America are $2.50, and can be entered through the usual subscription agencies or direct through the publishers :—

N.A.G. Press Ltd
226 Latymer Court
London W.6.
(Telephone : RIVerside 2143).

★

Contributions of scientific, technical and practical interest, and news items, are invited, but responsibility cannot be accepted for the safety of MSS, drawings, photographs or other matter submitted. Material not accepted will be returned.

★

All editorial communications should be made to the Managing Editor at

2 Charterhouse Street
London E.C.1
(Telephone : FLEet Street 1577)

Printed by
Martin's Printing Works Ltd., Berwick-upon-Tweed, England

Generally Speaking

Interchange

As a result of an arrangement concluded between the "Industrial Diamond Review" and the American journal, "Grinding and Finishing," future issues of this journal will contain a column by the Editor of "Grinding and Finishing," entitled "American Developments." Similarly, in future "Grinding and Finishing" will carry a parallel column by the Editor of this journal, entitled "European Developments." This direct interchange of information seems likely to be of considerable interest and value to recipients on both sides of the Atlantic, and we hope that all our readers and those of "Grinding and Finishing" will find it of value.

Exhibitions

London has recently seen "Interplas," the International Plastics Exhibition and is, at present, enjoying the Soviet Exhibition at Earls Court. Next month's issue of the "Industrial Diamond Review" will contain reports on both these exhibitions, and, we hope, a preview of the Europa Machine Tool Fair to be held at Brussels in September.

Our Error

We must apologise for a mistake which occurred in last month's "Industrial Diamond Review"—the Contents List. Unfortunately the Contents List for the previous month was reprinted in place of the correct one. This occurred owing to the unfortunate loss of the first set of proofs during dispatch from our London office to our printers, which entailed our sending a second set in a great hurry. The unfortunate inclusion of the wrong Contents List passed unnoticed in this circumstance. A stick-on correction slip is being issued, so our readers will be able to correct their copies with the minimum amount of difficulty. We apologise for any inconvenience that may have been caused by it.

Application of Industrial Diamonds VI

By

H. J. Otterloo

An extremely efficient method for the grinding and preparation of hardmetal work supports for centreless grinding machines.

Introduction

The use of hardmetal work supports in centreless grinding machines is no superfluous luxury, but a necessity. These machines are used not only for the production of large batches, but also for making articles with a surface finish which cannot be achieved economically, in many cases, unless hardmetal work supports are available. If the work supports are not faced with hardmetal, they wear so quickly that the surface roughness of the ground parts quickly becomes excessive. In order to prevent this, work supports have to be reground at short intervals, so that they become again more expensive, quite apart from the interruption in the work due to regrinding. This naturally does not exclude the occasional use of bronze, cast iron, or hardened-steel work supports for small batches. But once it has been decided to use hardmetal, other metals should be used only exceptionally, because it is even for smaller batches preferable to keep to the hardmetal work supports. It is not our intention in this paper to recommend the use of hardmetal work supports, but practical experience has shown adequately that they are definitely preferable for medium-sized and large shops. Owing to the fact that they are being used to a considerable extent, it has become also an important operation in such shops to keep these supports in good condition, and to prepare new ones. However, practice has shown that this is not a simple matter. The discussion of the method of preparing them is therefore intended here only to illustrate that these tools can be made economically only if one employs a certain method in their preparation. They are ground preferably only with diamond grinding wheels. Silicon carbide grinding wheels can be disregarded entirely in this connection. It is fairly obvious from the method of making these special tools that there is no question of rough-grinding them. By using only diamond grinding wheels, the preparation time is not only reduced to a minimum, but we also avoid the risk of making hair cracks in the tools, or at least we can reduce this risk to a minimum. The surface finish will meet the highest requirements, a matter which can be achieved only with difficulty when using silicon carbide grinding wheels. Since this grinding method can be carried out economically only if a certain procedure is followed, we shall deal with this procedure first, before discussing the actual grinding operation.

Fig. 1. Single-sided work support.

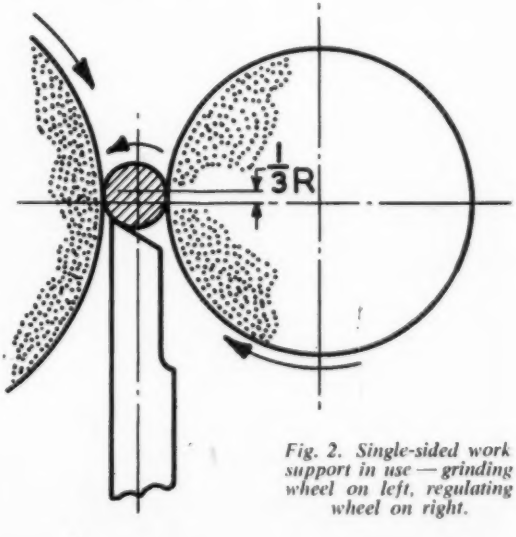
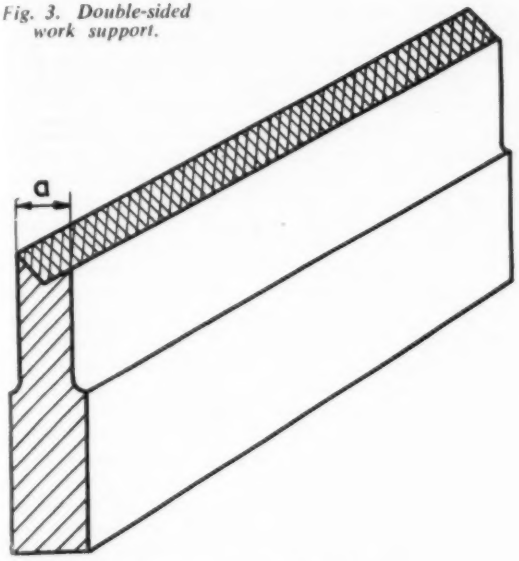


Fig. 2. Single-sided work support in use — grinding wheel on left, regulating wheel on right.

Fig. 3. Double-sided work support.



Forming or design of the work supports

The shape or design is an important factor, closely connected with the method of making these supports. We can see in Fig. 1 the simple work support, its use in the machine being diagrammatically shown in Fig. 2. Fig. 3 shows the double-sided work support, and Fig. 4 its use in the machine. Various large manufacturers of centreless grinding machines still recommend the type shown in Fig. 1, probably mainly on the grounds that the disadvantages of the double-sided work support are greater than its advantages over the simple work support. In order to understand this matter properly, we shall briefly discuss the advantages and disadvantages of these two types, but it should be noted that these data have been worked out only on the basis of practical investigations extending over many years.

Single-sided work supports

Advantages

They are more easily made, and for the grinding of a given number of diameters between 1 and 50 mm (0.04-2″) a very small number of work supports is required.

Disadvantages

It is a very difficult matter to set up the machine, special guides or input and removal devices being necessary, for the introduction and removal of the workpieces. We are therefore losing on the one hand, what we are gaining on the other hand.

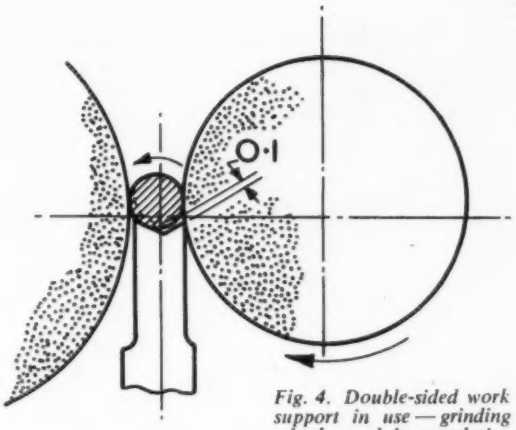


Fig. 4. Double-sided work support in use — grinding wheel on left, regulating wheel on right.

Double-sided work supports

Advantages

Setting up is a much simpler matter, takes up less time, the workpiece remains always in the Vee guide, while it tends to slide away in the case of the single-sided work support.

As regards the preparation of means of introducing and moving the workpieces, they can be kept to a minimum, and in most cases it will be possible to use some universal device. By turning the work support by 180°, when one side has been worn, a new edge is presented to the work, which improves the life of the work support quite appreciably.

Disadvantages

These are mainly the higher manufacturing costs, and a greater number of work supports is required for the grinding of a series of diameters, for instance, 1-50 mm (0.04-2″), for which series now 13 supports are required, as shown in more detail in Table 1. (p. 128).

Materials required for work supports

As already indicated, for smaller batches bronze, cast iron or steel will be adequate. As regards the grade of bronze, the normal commercial grades can be used. In the case of cast iron we would prefer the pearlitic type. For the types of steel to be hardened, we would select a wear-resistant chromium steel, which is also fairly resistant to deformation. The fact is that these work supports are subject to heavy wear. However, work supports are tipped with hard-metal only if the width *a* is at least 6.5 mm (¼″), because for technical reasons it is not possible to make them smaller, except at a very much

Table 1

No.	Work diameter, mm	Width of blade (a) of the work support, mm
1	1 — 1.2	0.8
2	1.2 — 1.5	1.1
3	1.5 — 2	1.4
4	2 — 2.75	1.7
5	2.75 — 4	2.5
6	4 — 5	3.5
7	5 — 7	4.5
8	7 — 10	6.5
9	10 — 13	9
10	13 — 18	12
11	18 — 24	17
12	24 — 36	23
13	36 — 50	34

higher cost. In the case of steel supports which are to tipped with hardmetal, we would select a type of carbon steel like St 42-11* or a similar type of steel, so that oxidation has no effect on it when the hardmetal tips are brazed on it.

The production of hardmetal work supports

The first attempts in the manufacture of hardmetal work supports are shown in Fig. 5. This illustration shows clearly that the hardmetal tips obtained from normal commercial sources are not fitting satisfactorily, as shown at *b* in Fig. 5. The plates were not resting properly on their base during the brazing operation, as shown at *c* in Fig. 5 so that considerable difficulties were encountered when grinding them with the aid of diamond grinding wheels. These wheels are clogged up by the brazing material, which interferes with their cutting action. In order to achieve some saving, the work supports are sometimes also made as shown in Fig. 6 and they are also obtained in this form from commercial sources. However, they present considerable difficulties in maintenance, and they are also difficult to prepare, because those parts which are not tipped with hardmetal are difficult to grind by means of diamond grinding wheels. For reasons of grinding technique (on the centreless grinding machine) it is not feasible to free the hardmetal tipping. The arrows show how these work supports wear excessively at those parts which are not tipped with hardmetal, so that this type of support has not a very long life. It is obvious that the wear of work supports at those points where they are not protected with hardmetal is the reason that more hardmetal has to be ground away than would otherwise be necessary.

Improved design of hardmetal work supports

After an investigation, in collaboration with the appropriate interested parties, a type of hardmetal tip has been selected, as shown in Table 2. These tips are used for work supports suitable for workpiece diameters ranging between 7 and 50 mm (9/32-2"). The design is as shown in Tables 3 and 4. The tips are now brazed in such a way that they rest entirely on the metal base, and that also their side edges are properly aligned and do not have to be reground, while the trailing edges only have to be ground smooth and flat, so that very little hardmetal has to be cut away.

Tables 3 and 4 show that there are two methods

* A German standard grade roughly equivalent to En 4 (Transl.).

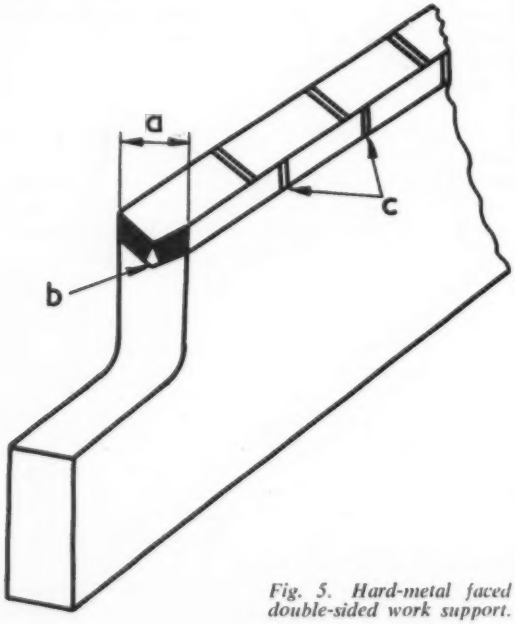


Fig. 5. Hard-metal faced double-sided work support.

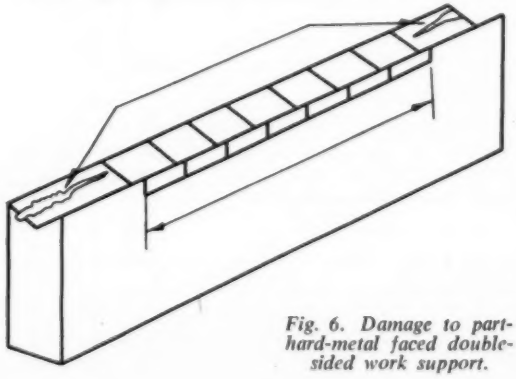
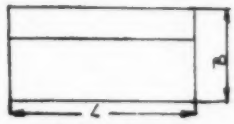


Fig. 6. Damage to part-hard-metal faced double-sided work support.

Table 2

Hardmetaalplaatje voor werksteunen. Overzichtsblad G258



L	B	S
10	3	2.5
20	5	3.5
20	11	6

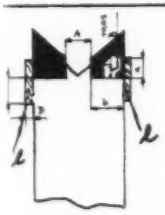
Uitvoering:
Hardmetaal kwal. C2.
Tolerantie op B en S =+0.2 scherpe kanten breken. De plaatjes zijn voorbehandeld, zodat ze onmiddellijk soldeerbaar zijn.

Hardmetal tip for the work support. Data Sheet G 258.

Design

Hardmetal grade C2. Tolerances of B and S = + 0.2 mm break sharp edges. The tips are pre-treated so that they can be directly brazed on the base metal.

Table 3

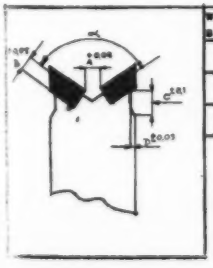


werk-steun	A	B	C	D	afmeting hardmet.	α°
7-10	1.5	1.2	2	2	3x2.5x10	120
13-18	5	2.1	2	2	3.5x5x20	120
24-36	11	6.4	2	2	6x11x20	120

a = 2/3 van de max. hoogte van de hardmetaalplaatjes
b = max. dikte van de plaatjes +0,05 mm

a = 2/3 of the maximum height of the hardmetal tips.
b = Maximum thickness of the tips + 0.05 mm.

Table 4



werk-steun	A	B	C	D	afmeting hardmet.	α°
10-13	4±3	1.9	2	0.2	3x2.5x10	120
18-24	9.4	2.5	2	0.3	3.5x2x20	120
36-51	15.8	5	2	0.5	6x11x20	120

of fixing the hardmetal tipping plates. In general we can say that the method of Table 3 is the preferred one, in the case of work supports for smaller diameters. This will be clarified in the further description of the method of preparation. The standardized hardmetal blocks of Table 2 can be used for either method. For making these standardized hardmetal plates, one should contact a hardmetal manufacturer, who will have no difficulty in supplying plates to the required dimensions and tolerances. These plates are supplied in such a condition that they can be brazed directly to the work support. This is again an important factor, because if the plates have first to be ground into shape, much time is again lost. Practical work has shown that hardmetal manufacturers can make these plates without any difficulty in accordance with the requirements. Figs. 7 and 8 show two work supports prepared according to the method described here. We can see at once how important it is, from the point of view of regrinding, that the middle part is left free. Special precautions must be taken when making this type of work support, and they can be made correctly under practical conditions only after many more or less unsuccessful attempts. If the method of Table 3 is used, the plates are again in an inclined position so that they cannot slide about while they are being brazed. On the other hand, in the case of the method shown in Table 4, they are still able to slide. In order to prevent this, a groove is milled during the preparatory work in the holder so that the hardmetal tips fit accurately into it. The piece *e* is milled away after brazing (Table 3). There is normally no difficulty in milling it away, when the milling machine has been set up, and it will not be necessary to regrind the side edges. The dimension A of Tables 3 and 4 is selected in such a way that even the small workpiece for which this

Fig. 7. Work support with vertically mounted hardmetal facing.

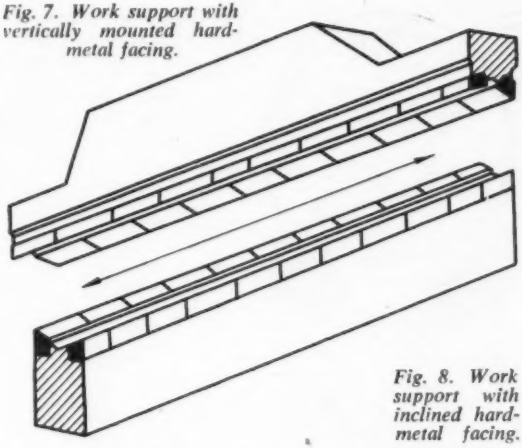


Fig. 8. Work support with inclined hardmetal facing.

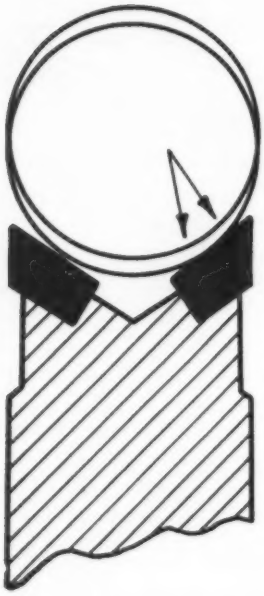
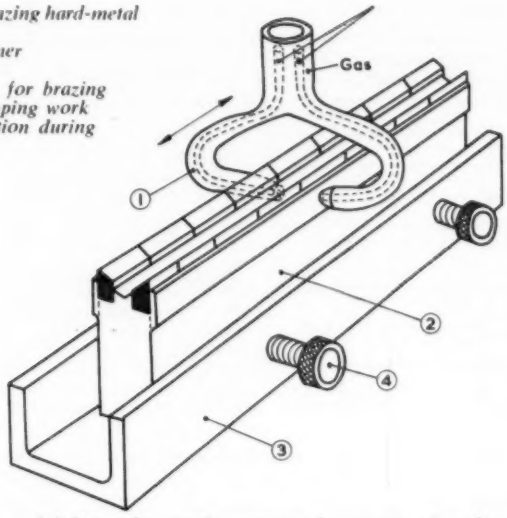


Fig. 9. Hard-metal facing of work support keeps workpiece clear of backing metal.

Fig. 10. Set-up for brazing hard-metal supports to base :
1. *Double-gas burner*
2. *Work support*
3. *Clamping block for brazing*
4. *Screws for clamping work support in position during brazing.*



series of work supports is intended will be able to rest on this workpiece, making contact only with the hardmetal, as shown in Fig. 9.

The brazing of the work supports

The brazing setup is shown in Fig. 10. When the support has been correctly rough-milled and deburred, as described, and the hardmetal pieces have been placed in position, the assembly is fixed in a holder, so that it will not move, while the gas burner is arranged so that it can be moved by hand, or by means of foot operated controls, without pushing the work support over. Many different methods have been tried and tested for brazing, the best results having been obtained when moving the gas burners by hand. A good brazing material is used, preferably a silver alloy, so that the brazing temperature can be kept fairly low, about 1020-1110° F. Due to the fact that the hardmetal tips are in fairly good contact with the metal base, no seams are formed, a matter presenting considerable advantages for grinding. The double burner used for this purpose is also a great help in this connection.

This is due to the fact that the internal stresses are smaller, because the material is heated up uniformly. Work supports made in this way can now be reground in a perfectly simple manner by means of diamond grinding wheels. Before discussing this grinding method in more detail, we shall briefly summarize again the method of preparation as discussed here.

a. Making the work support base out of carbon steel (St 42-11) or similar material.
b. Grinding the work support parallel, to a certain thickness.
c. Milling the profile supporting the hardmetal tips, according to Tables 3 or 4.
d. Deburring the workpiece and fixing the tips.
e. Brazing, as discussed, at temperatures of 1020-1110° F.
f. Cleaning and brushing.
g. Mill away the auxiliary pieces *e*, in order to free the hardmetal.
h. Grinding the guide faces, using a diamond grinding wheel.
i. Grind the lower edges parallel; this is the last operation.

The grinding of the work supports

This entire introduction into the process of preparing these work supports was only intended to illustrate the grinding method. Our introduction took up so much space because there is no economical justification in making these work supports from hardmetal, if they are not carefully prepared. We know from experience that many works hesitate to make or use hardmetal work supports, because the maintenance of these appliances seemed to be too difficult, quite apart from the question of making these appliances in the first place. As a matter of fact, the maintenance is a difficult matter, and for this reason endeavours have been made to search for a method which is economically justifiable, and this has resulted in the method described above.

It is obvious that grinding requires again

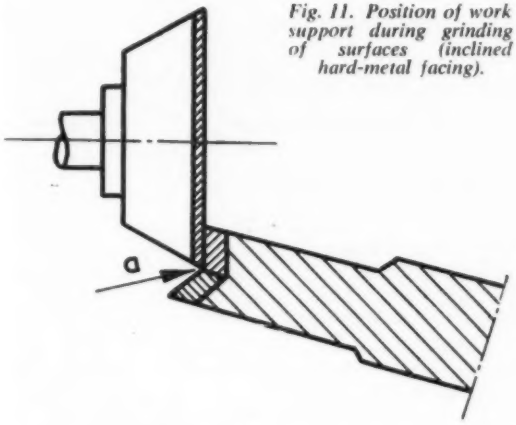


Fig. 11. Position of work support during grinding of surfaces (inclined hard-metal facing).

Fig. 12. Form to which work support should be ground.

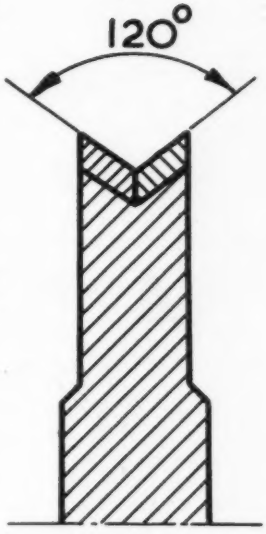
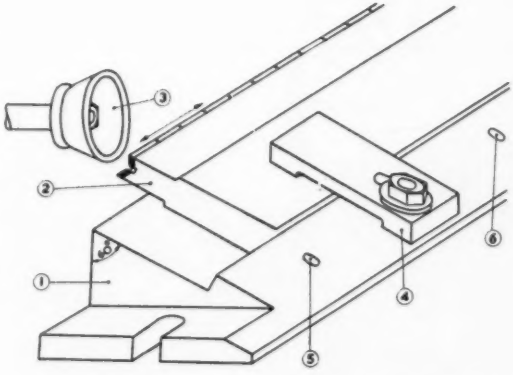


Fig. 13 (below). Set-up for grinding work support on universal grinding machine:
1. Angled base support.
2. Work support
3. Diamond grinding wheel (flared cup)
4. Clamping piece
5 & 6. Alternataive positions for clamping piece.



certain special precautions. These precautions can again be made dependent on the machines available. This is so because in those works where this method has been developed, any given machine was not always available. Two procedures have been developed:

a. Working with a universal tool grinder, shown diagrammatically in Figs. 11, 12, and 13.

b. Working on a normal horizontal surface grinder, as shown diagrammatically in Figs. 14 and 15.

We shall briefly discuss these two methods, one after the other. We shall not go into any details as regards the correct grinding technique when using diamond grinding wheels, because we have discussed this matter in some detail in the previous chapters. All the important factors governing this grinding process are also applicable in this particular case.

Grinding on the universal tool grinder

One of the factors bringing about a change in the method of working was the great difficulty encountered in connection with the fact that the diamond grinding wheel could not be got out of the corner. In Fig. 11 we can see clearly at *a* that the corners of the diamond grinding wheel are subject to heavy wear, as already discussed in the previous chapter. Fig. 16 shows clearly how the different method in conjunction with the correct adaptation of hardmetal tips enables the corners now to be cleared by the diamond grinding wheel. Diamond grinding wheel 2 is mounted here on grinding spindle 1 of the universal tool grinder, and the work support is clamped on the machine table in a manner to be discussed in more detail. This simplifies the entire grinding process. Fig. 13 shows diagrammatically how the work support 2 is clamped on a cast iron clamping piece 1 by means of clamping plates 4. Several screw holes 5 and 6 present a possibility for accommodating different lengths in a satisfactory manner. Diamond grinding wheel 3, a plastic bonded D 70 wheel, simply grinds the raised edges of the hardmetal tip. This will not only ensure that the desired angle is ground correctly, but the parallelism of the sides meets the requirements, because the support of the work support, i.., cast iron block 1, can be aligned accurately by means of the dial gauge. Mist lubrication is used, as already described in a previous chapter. Surfaces *a*, *b* and *c* are first ground parallel on a normal surface grinder, to the desired dimension (see Fig. 17).

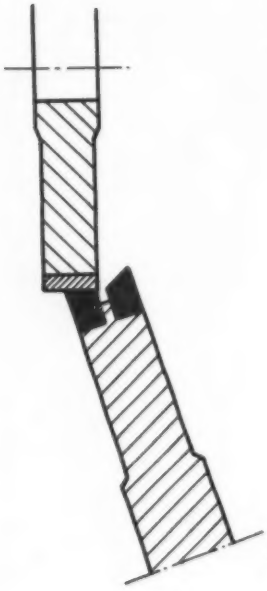


Fig. 14. Position of work support during grinding on surface grinder.

Fig. 15. Set-up for grinding work support on surface grinder:
1. *Magnetic chuck*
2. *Special shaped block*
3. *Angled base support*
4. *Work support*
5. *Clamping piece*
6. *Diamond grinding wheel*
7. *Spindle housing.*

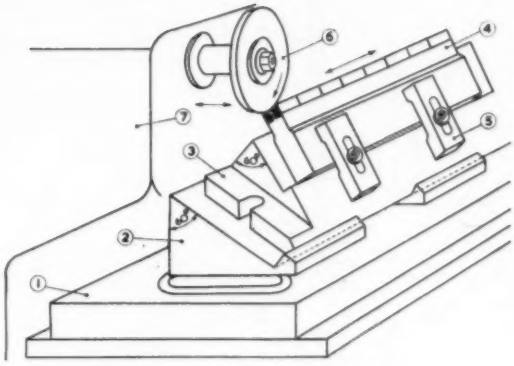


Fig. 17. Dimensions of work support to be pre-ground.

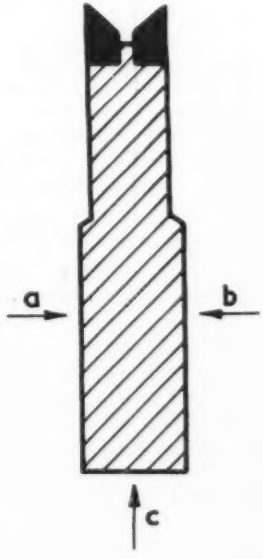
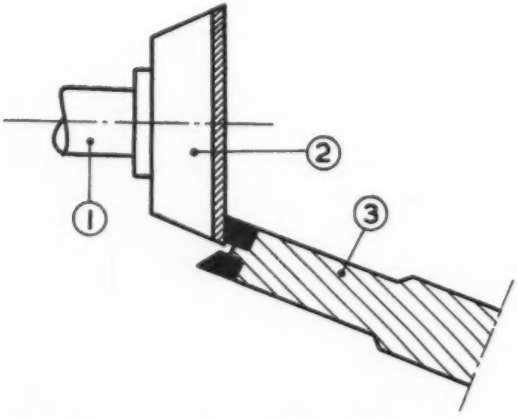


Fig. 16. Position of work support during grinding of surfaces (with vertical hard-metal facing).



Grinding on an ordinary surface grinder

This method is shown diagrammatically in Fig. 15, it involves the use of an auxiliary clamping block 2 as shown in Fig. 18 (see also Fig. 14). These blocks are placed on magnet 1, on which the cast iron clamping piece 3 is clamped, and the work support 4 is fixed by means of clamping plates 5. The diamond grinding wheel is in this case a parallel wheel, 200 mm diameter (about 8 inches). One important advantage of this method is the automatic feeding and the generous supply of coolant. After the work support has been correctly adjusted, it can be ground in position, if the work has been correctly prepared.

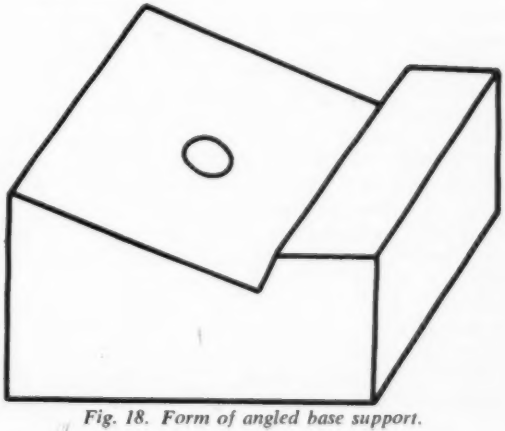


Fig. 18. Form of angled base support.

Physical Mechanics

The study of small surfaces of friction and wear by the replica method. Diamonds used in drilling

by Robert Courtel and Edmond Mencarelli

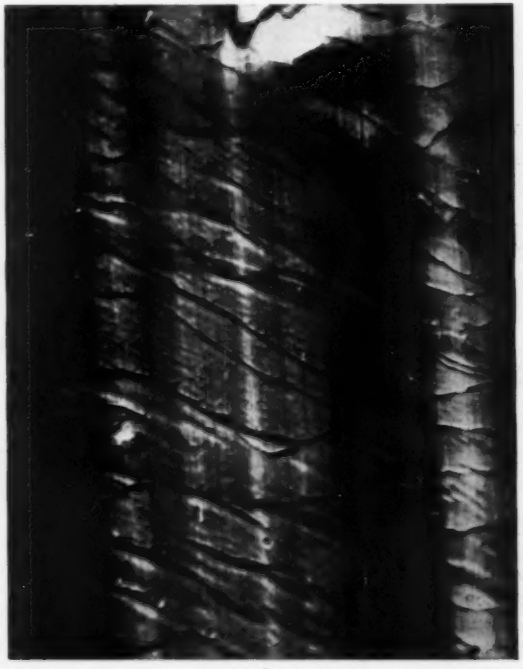
A study has been made of the surface of small diamonds (of the order of 1 mm) used for drilling by the replica method in synthetic resin and by the double impression resin/carbon method. The different characteristic types of damage to the surfaces caused by working in the rock (cracks, network of ridges, surface roughness) are described and briefly analysed.

To examine in detail the possibilities of using the replica method in the case of small friction surfaces, a study has been made in this way of drilling diamonds with measurements in the range of a millimeter; some hundreds of them were set in a crown of the classic well-drilling type. This drilling bit was examined after being taken out of normal service, the surface of the stones being always carefully chemically cleaned before examination to eliminate traces of casing and fragments of rock.

The replica method is the one using synthetic resin as described by Jacquet and others,[1],[2] now in current use, notably in fractography. As the curvature of the stones studied was found to be too great to allow a replica of 0.1 to 0.2 mm thickness (the preferred value both for formation and for lifting) to be subsequently flattened and examined by reflexion or by transparency with magnification greater than 200, it has been necessary to proceed by cutting ' in situ ' before lifting, with the aid of a surgical lancet, almost flat fragments of the replica corresponding to the areas to be studied. This is done under a binocular lens magnifying 20 or 30 times. In these conditions surfaces measuring only 1/100

Fig. 1. Very fine transverse cracks (1000 magnification).

Fig. 2. Parallel raised lines (800 magnification).



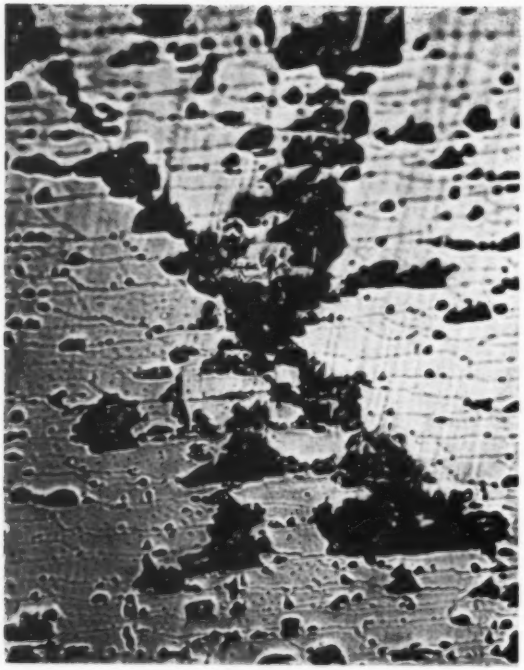


Fig. 3. Small general cavities (400 magnification).

Fig. 4. Pinpoint cavities (4000 magnification).

sq mm (that is 0.1 mm long) can be isolated; these surfaces must be removed and stuck upside down on the stage.

Broadly speaking, the imprints obtained can be examined by transparency (with slight enlargement) or by reflexion after metallization with aluminium. In this last instance the methods of interference contrast (Nomarski), interferometry, and oblique lighting have been used. On the other hand, a number of replicas has been reserved for the purposes of examination by electron microscopy, using the method of the double impression resin/carbon.

On all the surfaces of the monocrystals that have 'worked' that we have had the opportunity to examine, we have thus observed three main types of very characteristic damage:

(A) Cracks (very fine lines) (Fig 1) either run right across the surface of the particles, or vanish after crossing a certain distance; two such lines can intersect; they constitute faults separating two planes that can differ by form a fraction of a micron to several microns. They do not appear to present marked crystallographical orientation, and include, moreover, many curved parts.

(B) With sufficient magnification (and especially in interference contrast) a network of rather fuzzy lines can be seen, spaced at intervals of several microns on an average, and roughly parallel to a single direction on each surface, always markedly at an angle to the direction of work. They frequently contain forks or ramifications running in a second direction, and thus constitute a kind of honeycombed network. The crystallographical orientation has not been determined in most cases. It has been possible to establish it, however, by simple optical observation in the particular instance of a particle in which there subsisted, intact, a natural octahedral face (III) bearing a very clear trigon. One of the facets of wear was also clearly a III plane, and the corresponding direction, very well marked perpendicularly to the direction of work, was parallel to one side of the trigon. It was a question, therefore, of a 110 direction of one of the planes of cleavage (III) of the monocrystal intersecting with the face considered.

In other respects the examination with oblique lighting and by interferometry indicated in every case that it was a question of ridges more or less inclined, of a height in the range of several hundredths of a micron on an average.

(C) On the faces exposed to abrasion by the rock a pocking of the surface was observed (Fig 3) discernible as small cavities, approximately tetrahedral in the particular case shown in Figure 4, or of a more complex form. One of their edges is always exactly placed on one of the lines of the network described above, the rest of the cavity being situated on the side away from the approaching rock, that is, in the direction of abrasion. Some cavities are prolonged, in this same direction, by ' comets ' or fuzzy rectilineal furrows of a certain length which appear along the line of work.

The presence of certain structures fairly analogous to those described above (para. B) has been reported in the past, notably by Tolansky[2], on the faces of both rough and cut crystals, and even more recently by Wentorf[3] on cubic faces intentionally ground on the diamond. To interpret the results of his experiment Wentorf invokes the mechanism of fracture in tension following the planes of cleavage of the diamond (or faces of the octahedron). Although the few observations described above all tend equally to give a predominant role to the (III) planes, the only examination of a worn drilling crown which we have undertaken does not allow us to conclude that we are here concerned with the presence of the same mechanism. In any case, it is the first time, to our knowledge, that it has been possible to make methodical studies under such magnification of very small stones of any shape, constituent parts of tools in actual service. We propose to turn this very simple non-destructive method to good account in systematic studies of wear. An important feature of this method is its very great sensitivity to every possible alteration on the surface of the tool caused by friction and shocks in the course of work; and it allows one to follow easily the local evolution of phenomena.

References:
(1) A. Van Effenterre, P. A. Jacquet, E. Mencarelli *Comptes rendus* 1956 Vol 242 p 2355
(2) P. A. Jacquet, A. Van Effenterre, *Rev Metall* 1957 Vol 54 p 107
(3) S. Tolansky, The microstructures of diamond surfaces, London 1955
(4) Wentorf, *J appl Phys* 1959 Vol 11 p 1766 (Nov)

Airport Robbery

The ten men (including BOAC loaders) who were recently charged with the theft of a large number of industrial diamonds and other valuable property appeared before the Uxbridge Magistrates at the beginning of this week. They all pleaded not guilty and reserved their defence, and were released on bail until their appearance which will take place at the London Sessions at the Old Bailey.

COMPENTRAD LTD

FOR

DIAMOND IMPREGNATED TOOLS

CONTINUOUS RIM CUTTING DISCS - SEGMENTED DISCS UP TO 3.METER DIAMETER - GRINDING WHEELS - CUP WHEELS - STRAIGHT WHEELS - PENCIL EDGING WHEELS

THE BEST TOOL FOR THE JOB

TEL. MONARCH 1257
9768
9769

31, THROGMORTON STREET
LONDON, E.C.2

*How to Finish Flame-Plated Coatings**

by **M. A. Teter****

The flame-plating process is a fast and economical method of applying thin, tenacious coatings of hard materials, such as tungsten carbide and aluminium oxide and various other materials. This process, developed by Linde Company, is used primarily in precision applications, where wear is an extremely critical factor. However, the coatings requiring finishing are only as good as the technique employed in finishing.

Although the coatings involved all have extreme hardness, conventional equipment and abrasives can be used successfully providing the techniques developed by Linde are observed. Special requirements and precautions are necessary for good results in finishing flame-plated parts to be better than 1 microinch rms, starting from as as-coated thickness as great as 150 microinch rms.

For parts requiring finishing, there are, in the main, two satisfactory finishing methods, both of which use standard types of equipment. One involves precision diamond grinding or diamond grinding plus lapping. The other involves off-hand polishing with either silicon carbide or diamond abrasives.

Precision finishing

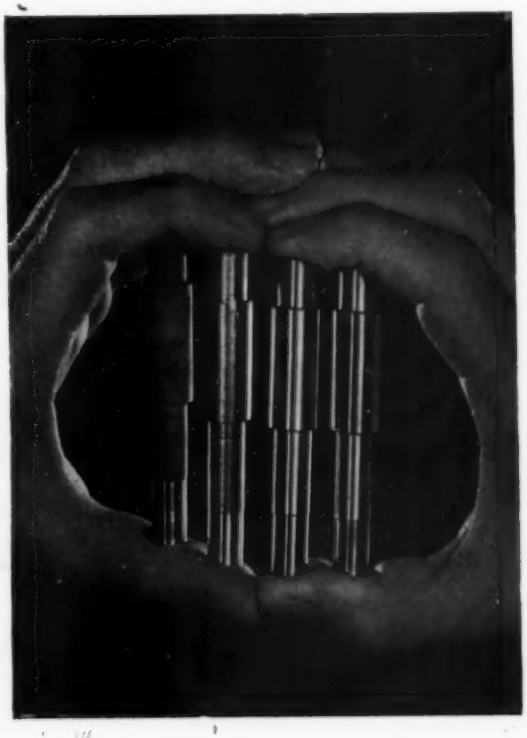
In the selection of diamond wheel, the bonded resinoid 100 concentrate has proved thus far to be the most satisfactory. Grit sizes in the range of 100 to 400 are acceptable, and the choice should be determined by the microinch finish specified for the as-ground surface. Either an 'L' or 'N' hardness wheel bond has been acceptable for all finishing done.

It is imperative to use a flood coolant during the grinding operation. Water plus one or two per cent of rust inhibitor oil is best suited as a coolant, and produces consistently good results with minimum wheel loading tendencies. Other coolants tend to cause wheels to load up. This results in a smeared or shiny as-ground surface rather than a non-glossy clean diamond-cut as-ground surface.

Infeeds per pass should not exceed 0.0001 to 0.005 inch. These infeeds are for a range of 400 grit to 100 grit wheels respectively. Excessive crossfeeds, whether surface or cylindrical grinding, should not be employed. Crossfeeds from 0.040 to 0.080 in./pass for surface grinding and from 0.040 to 0.080 in. crossfeed per revolution of the workpiece in the case of cylindrical grinding are recommended.

These crossfeeds are safe within operational limits and possibly can be exceeded. With greater crossfeeds, however, there is danger of building up excessive spindle pressure and a rubbing action rather than clean cut may result.

Fig 1. Shown below are four possible finishes on Flame-Plated parts, including one as-coated, by Linde Company, Division of Union Carbide Corporation. The part, as-coated, appears left. This has a finish of 125-150 RMS. Next, the Flame-Plated surface has been polished with an 80 grit rubber-bonded silicon abrasive (C-80-S11-Chicago Wheel & Manufacturing abrasive). This has a finish of 50-70 RMS. The third in order is a flame-plated surface with a (D 220 N 100 BR) diamond wheel to a finish of 8-10 RMS. And, right, is the part ground with the same 220-grit diamond wheel, then lapped on a centreless cast-iron lap with No 3 Bureau of Standards rating to a finish of 1-1.5 RMS.



* *Grinding & Finishing* 1961 Vol 7 (1) pp 40-42 (Jan)—Reprinted with kind permission of the publishers.

** Application Engineer, Linde Company, Division of Union Carbide Corporation.

Fig 2. A curved surface is shown being finished with an abrasive belt backed by a resilient contact wheel. Small flats and single curved surfaces are best finished this way. The wheel material is fairly critical as too hard a wheel causes chatter and too soft a wheel results in rounding off the edges of the finished areas.

Peripheral wheel speed of from 5,000 to 6,500 sfpm are acceptable. It must be remembered, though, that the higher the sfpm, the harder the wheel acts. At 5,000 surface feet/min. for example, an 'N' hardness wheel behaves similarly to an 'L' hardness wheel at 6,500 surface feet/minute.

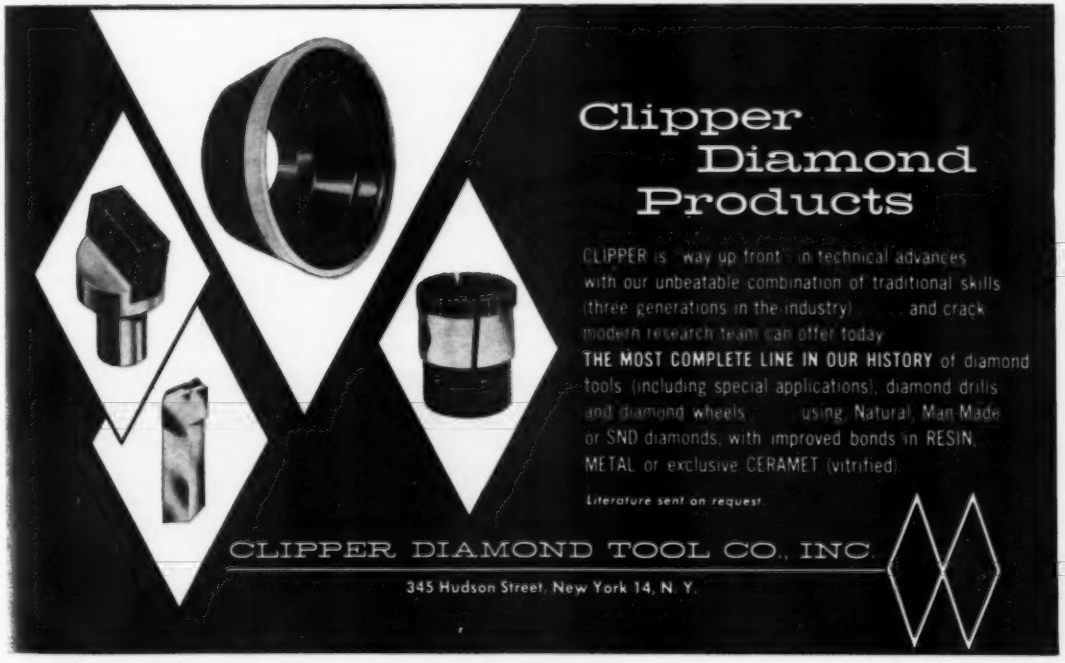
A diamond wheel should be balanced initially and trued on its own wheel mount for a total maximum runout of 0.0003 inch. Buying a separate wheel mount for each diamond wheel is economically sound for two reasons:

(1) The labour time involved in balancing and truing each time a wheel must be remounted; and

(2) The waste of diamond abrasive whenever a diamond wheel must be retrued.

In most cases, retruing a diamond wheel is not necessary during its life if it is left on the same wheel mount and is not abused or allowed to become extremely glazed or loaded. Fairly frequent dressing or cleaning of the wheel with a silicon carbide (37C40017V) stick will keep the wheel clean and free cutting.

It is imperative not to attempt to get a better rms finish than the grit size of the wheel is designed to produce. While a dulled or glazed wheel will give a more shiny and lower rms finish than one in a free-cutting condition, the resulting surface under high magnification will be smeared and possibly heat-checked.


Clipper
Diamond
Products
CLIPPER is "way up front" in technical advances with our unbeatable combination of traditional skills (three generations in the industry) and crack modern research team can offer today
THE MOST COMPLETE LINE IN OUR HISTORY of diamond tools (including special applications), diamond drills and diamond wheels using Natural, Man Made or SND diamonds, with improved bonds in RESIN, METAL or exclusive CERAMET (vitrified)
Literature sent on request
CLIPPER DIAMOND TOOL CO., INC.
345 Hudson Street, New York 14, N. Y.

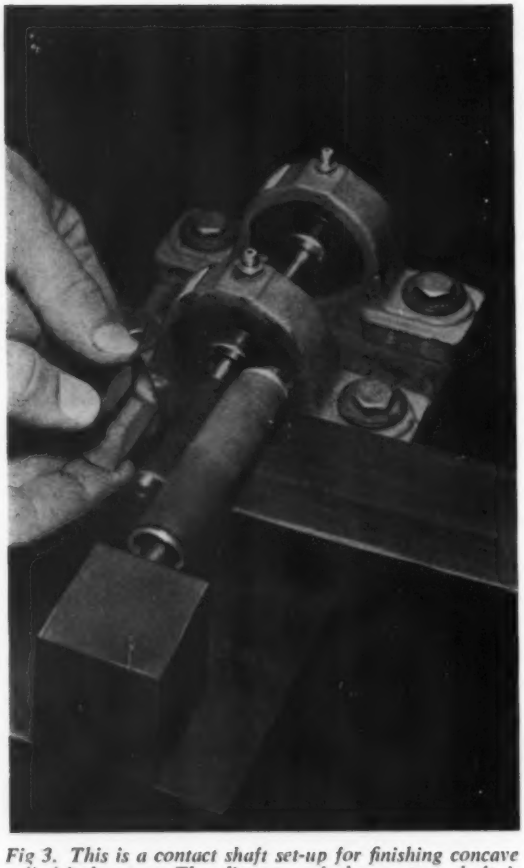


Fig 3. This is a contact shaft set-up for finishing concave cylindrical areas. The diameter of the contact shaft is determined by the radius of curvature of the part to be finished. It is important to maintain sufficient tension between the belt and the shaft to prevent slippage which causes frictional heat and short belt life. Speeds of about 2000 sfpm are recommended for dry operation, but speeds as low as 400 sfpm have been used satisfactorily with the contact shaft.

Properly ground flame-plated surfaces, using up to 400 grit wheels, therefore, should not appear glossy or polished. RMS finishes that can be expected from 100 concentration bonded resinoid diamond wheels (either 'L' or 'N' hardness) are as follows:

100 grit.....16-24 micro-inches rms
220 grit..... 8-12 micro-inches rms
400 grit.....4-8 micro-inches rms.

Finer RMS finishes can be obtained with standard diamond abrasives and lapping equipment with few exceptions. A cast iron or Meehanite lap has proved to be most desirable.

Two positive requirements for lapping flame-plated surfaces are:

1. Pressures of 15 lbs/in² and up; and
2. Use of a very thin vehicle such as mineral spirits, oleum spirits, paint thinner, etc.

Vehicles with higher film strength and thickness tend to build up a film wedge as thick or even thicker than the size of the diamond abrasive. This results in a hazy or frosty finish because the boart tends to roll or gauge rather than embed itself in the lap and cut evenly.

Following is a chart which gives the approximate rms finish to be expected when lapping with various-sized diamond abrasives.

Bureau of Standards No	Diamond Particle Size microns	Approx RMS to be expected micro-in.	Mesh Size Equivalent
1	0-2	1	14,000
3	1-5	2	8,000
6	4-8	3-5	3,000

Non-precision finishing

As-coated flame-plated surfaces are usually in the range of 125-150 micro-inches rms. This as-coated roughness very readily and inexpensively can be improved to a finish of between 50 and 75 micro-inches RMS.

A soft rubber bonded silicon carbide abrasive has proved to be quite effective. An 80 grit in this type of bond is the most suitable. Finishing time is a matter only of seconds or minutes depending on the area involved.

Silicon carbide sticks (80 to 300 grit, 'H' to 'L' hardness and vitrified bond) and diamond sticks (80 to 300 grit) have also been successful in polishing flame-plated coatings.

Fig 4. A typical belt finishing set-up. The belt is backed-up at the point of cutting either by a flat platen between the wheels and under the belt, or by one of the wheels, or the shaft. The back-up varies in shape and material, depending upon the application. Loose belt finishing has not proved satisfactory for Flame-Plated parts.

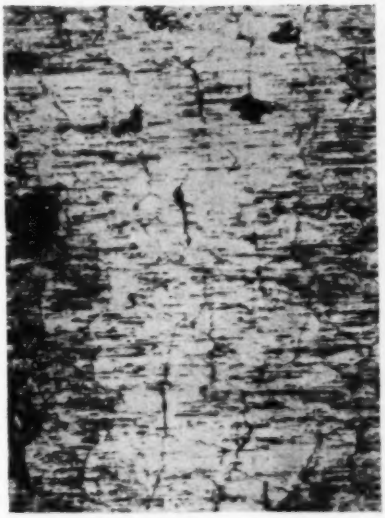


Fig 5. This photograph shows a cracked and torn surface of a Flame-Plated coating ground with an aluminium oxide wheel, as magnified 100 times. Even in its most friable form, aluminium oxide is too tough to be used as a grinding medium for Flate-Plated coatings. The cracks in the coating are caused by the heat generated by the dull, tough aluminium oxide grains during grinding, even when the operation is flood cooled.

Those operations are essentially done dry if the relative surface speed is such that excessive heats are not built up. All that is required essentially for proper polishing is to provide a suitable relative surface speed between the area to be finished and the abrasive.

The finishing techniques described have been shown to be consistently good, and deviations from these procedures generally result in an unacceptable surface quality.

As a parting statement, we repeat that flame-plated coatings that require finishing are only as good as the techniques employed to work them.

Oil in Yakutia

Siberian diamonds will soon be cheaper, it is claimed, thanks to the discovery of large oil deposits in the adjacent area. Plentiful fuel will reduce the cost of diamond extraction, which is high owing to the icy and isolated location.

Oil has been found in many parts of Siberia: in north-east Yakutia, between the Khatanga and Anabara Rivers near Beryozova in West Siberia, on the River Ob and the River Konda.

The search for other deposits is well under way, and the first wells have been sunk in the Irkutsk region, promising even bigger reservoirs in the region.

Soviet geologists believe that they are on the threshold of new and bigger discoveries in Siberia.

THE HENDERSON DIAMOND TOOL COMPANY LTD.,

43-45 ALLESLEY OLD ROAD, COVENTRY

Telephone : Coventry 75617

MANUFACTURERS OF DIAMOND TOOLS.

ALL TYPES OF ABRASIVE DIAMOND TOOLS

RESET AND RETURNED WITHIN **48 HOURS**

OF RECEIPT AT THE ABOVE OFFICE.

TOOLS FOR SPECIALISTS MADE TO CUSTOMERS OWN REQUIREMENTS

CLASSIFIED ADVERTISEMENTS

2d. a word, minimum 4/-. Box Numbers 1/- extra.
Address Box No. replies to : N.A.G. PRESS, LTD., 226 Latymer Court, London, W.6.

TIME RECORDERS.—Sales—Rental Service. Tel. HOP. 2239. TIME RECORDER SUPPLY & MAINTENANCE CO. LTD., 157/159 Borough High Street, London, S.E. 1.

MR. M. DAVIDSON, F.S.M.C., qualified opthalmic optician, is in constant attendance, for sight-testing and dispensing of optical prescriptions, at the HATTON OPTICAL CO., 19 Hatton Garden, E.C.1. (Tel. HOL 8193).

JEWEL BEARINGS for watches, precision industries and the jewellery trade—high grade quality—very competitive prices. Sawing, drilling, enlarging, turning, recessing of synthetic ruby and sapphire, germanium and other hard materials. We are interested in being represented in other countries. S. I. CARDANA, ORNAVASSO (NO.), ITALY.

DIAMOND POWDERS, purity 98% +, recovered from diamond cutting and polishing powder (0 — 40 micron) for $2 (U.S.) crt. DIACEM, Schupstraat 9, ANTWERP, BELGIUM.

DIAMOND POWDERS mesh and microns, purity 98/99%. Also recovered diamond powders 0-40 micron available at the price of US $1.95 per carat. Point and Splinters. **AFRIKA DIAMANT BOART, VESTINGSTR. 53, ANTWERP, BELGIUM.**

IF YOU WANT TO KNOW what is going on in the diamond industry ask to be put on the mailing list of *HABIT NEWS*, a journal which is published quarterly by HABIT DIAMOND TOOLING, LTD., Lurgan Avenue, W.6.

IT WAS MACMILLAN, not Habit, who said "You've never habit so good."

FOR HIGHEST CASH PRICES for used boart and diamond fragments contact DAVID GRUBER, DIAMOND EXCHANGE & MART, 57 Aspenlea Road, W.6.

HABIT's lowest price for the re-setting of a diamond into a simple shank is 7s 6d and such an operation cannot be carried out for less—even by the one-man business operating in a backyard shed.

IF YOU WANT TO KNOW why HABIT TOOLING is held in such esteem by large and small concerns alike—come and see for yourself ! The HABIT factory welcomes visits by either individuals or parties. This invitation is extended to include our competitors. HABIT DIAMOND TOOLING, LTD., Lurgan Avenue, W.6.

EXPERIENCED industrial diamond polishers required for new factory in Midlands area. Permanency. Pension Scheme, top rates and 40-hour week. BOX 2113.

SPACE PROGRAMME. HABIT needs more room. Any information leading to the acquisition of suitable premises in the S.W. London area will be suitably rewarded.

FOREMAN industrial diamond polisher to take charge department in new factory in Midlands. Strict confidence observed. BOX 2114.

HABIT wish to get a new slant on business efficiency and in consequence have vacancies in status positions. Applications invited from retired Field Marshals, Admirals, Air Marshals and particularly ex-Public Company directors and top brass Civil Servants. Successful applicants must be prepared to undergo extensive Public Relations training and be groomed for top level negotiations with both sexes. Service types must produce baton, gold braid and demob. papers. Apply in strictest confidence to Commodore Cholmondly-Curtis at Habit House, Lurgan Boulevard, London, W.6. Enclose stamped, addressed envelope.

SALES REPRESENTATIVES with common sense and some knowledge of engineering workshop practice are required by Habit Diamond Tooling, Limited, Lurgan Avenue, London, W.6., to reside and operate in all areas in Great Britain and overseas. Those with previous experience in the Diamond Tooling Industry are also invited to apply. Applications will not be considered from anyone who:

(a) Leans for support against bars in public houses, hotels and clubs.
(b) Pays undue attention to the games of golf, cricket, football, snooker, etc., to the detriment of his work.
(c) Does the household chores in order that his wife may get to work on time.
(d) Cannot readily do a normal day's work from 8 a.m. to 6 p.m., plus if necessary.
(e) Indulges in excuses regarding business recession to cover up laziness or inability.

There are fine prospects with HABIT for the man who is prepared to work and 'use his loaf.'

ADVERTISERS' INDEX

	Page
Clipper Diamond Tool Co. Inc.	137
Compentrad Ltd.	135
Diamant Boart	122
Drukker, D. & Zn. N.V.	124
Habit Diamond Tooling Ltd.	Cover III
Henderson Diamond Tool Company, Ltd., The	139
Impregnated Diamond Products Ltd. ...	Cover IV
Indusmond (Diamond Tools) Ltd	123
Industrial Diamond Co. (Sales) Ltd. ...	Cover II
Smit, J. K. & Sons (Diamond Tools) Ltd ...	121
Triefus & Co. Ltd.	Cover I
Wolverhampton Diamond Die & Tool Co. Ltd.	123

● PUBLISHERS : N.A.G. PRESS, LIMITED
226 Latymer Court, Hammersmith, London W.6, England Telephone : RIVerside 2143

INDUSTRIAL DIAMOND ABSTRACTS

Industrial Diamond Information Bureau,
2 Charterhouse Street, London, EC 1.
Telephone : FLEet Street 1577

1961 Volume 18
JULY

DIAMOND MINING AND INDUSTRY

De Beers well equipped to meet the difficult times ahead in Africa

Anon. *Min J* 1961 Vol 256 (6560) p 555 (May 12)

Chairman's statement : De Beers Consolidated Mines Ltd.

Diamond sales in 1960 were £89,700,000. Increased purchases from USSR and Sierra Leone, without a corresponding increase in sales, resulted in increased stocks. Sales for the first quarter of 1961 were a record at £24,302,000.

The erection of new plant at the Premier Mines, Transvaal, should compensate for the loss of the type of stone previously available from Ghana.

Whilst Congo boart continues to be delivered in the normal manner, the new plant for producing synthetics will be operated on a restricted basis.

W *F.251/Fh Qc/Hd.361*

Diamond sales not so buoyant

Anon. *Min J* 1961 Vol 256 (6560) p 549 (May 12)

While diamond sales in 1960 were a near-record, purchases by the Diamond Corporation increased considerably and there was a substantial increase in their stocks. C.S.O. sales in the first quarter of 1961 were a record, but the high level is not expected to continue.

De Beers intends to produce synthetic diamonds in the second half of 1961. The company carrying out this work is called Ultra High Pressure Units Ltd.

W *F.251/Fh Ha.13*

Mining miscellany

Anon. *Min J* 1961 Vol 256 (6560) p 537 (May 12)

The new shafts to be sunk at De Beers' Kimberley mine is expected to be producing 5,000 loads of diamond-bearing material per day by 1965. The mine's blue ground was considered uneconomic when the mine was closed in 1908. *W* *Ebd F Hd.3612*

Diamondiferous lottings

Anon. *Mindrill Bits & Pieces* 1961 Vol 14 (2) p 6 (Feb)

Guinea possesses important diamond deposits but there are no kimberlites or other basic rocks in the area. Industrials are the main output ; yield is between 0.6 and 6 cts/cu yd in one region.

D *Fc Hd.3671*

Mining in Tanganyika in 1960 : diamonds

Anon. *Min J* 1961 Vol 256 (6559) pp 505-507 (May 5)

The major part of this territory's diamond exports was mined by the Mwadui mine of Williamson Diamonds Ltd, although the grade treated was lower than that of previous years. The prospect shaft, begun in 1959, was completed. The sample pitting programme was continued, and the bulk sampling plant operated throughout the year. While the old treatment plant and sampling plant of Alamasi Ltd, who provide about 4% of the territory's diamond output, were temporarily closed down as a result of water shortage, their new treatment plant enabled a larger tonnage of lower grade gravels to be handled with improved recovery.

T *Eb Hd.364*

Diamonds and the Commonwealth

Anon. *Diamond News* 1961 Vol 24 (7) p 4 (Apr)

It is stated that, once South Africa has withdrawn from the Commonwealth, the Commonwealth will no longer be the largest producer of gem diamonds, and that the general level of Commonwealth diamond production will be reduced materially. However, South African diamonds will, it is stated, be sold on the same basis as in the past.

T *F.13.311/F.251.361*

Race to make synthetics

Anon. *Diamond News* 1961 Vol 24 (7) p 22 (Apr)

Besides America and South Africa, other countries are in the race to make more synthetic diamonds. Sweden and Holland are well advanced with their researches, while the Russians are now believed to be operating pilot plants that may produce at least 5,000,000 cts this year. *T* *Fh Ha*

Romantic story of De Beers Mine Discovery in 1871 : Now to be re-opened after close-down for 53 years

Anon. *Diamond News* 1961 Vol 24 (7) pp 15-17 (Apr)

After lying idle for fifty-three years, the old De Beers Mine is being reconditioned, and will be fully active by 1965. This mine's past record was outstanding, both in quality and in quantity. With the present increase in demand for more diamonds — an indication of the diamond trade's prosperity at this time — the re-opening of this mine, coupled with the improvement of mining methods since the date of it's closure, could help to provide the greatly needed extra quotas of stones.

T *Eb Hd.361*

CONTENTS

Diamond Mining and Industry...	A173	Rock Drilling	A183
Physical, Chemical, and Mechanical Properties of Diamond	A174	Wire Drawing	A184
		Grinding and Polishing of Carbides and Metals	A184
Physical, Chemical, and Mechanical Properties of Hard Materials	A176	Machining Processes and Developments ...	A189
		Production, Grading and Recovery of Abrasive Particles	A190
Diamond, etc, in Instruments	A177		
Hardness, Wear Testing and Precision Gauging	A177	Tool Production...	A190
		Powder Metallurgy	A191
Truing of Grinding Wheels	A178	Miscellaneous	A191
Precision Machining of Metals	A181	Book Reviews	A191
Cutting and Machining of Stone, Glass, etc ...	A182	Patent Lists	A192

De Beers Co. to open man-made diamond factory at Springs

Anon. *Diamond News* 1961 Vol 24 (7) p 20 (Apr)

In order to afford some protection against possible interference with regular production in the Congo, De Beers Co is to produce man-made diamonds at Springs in South Africa on a commercial basis. It is stated that, while natural grit is more efficient than its synthetic counterpart, the market can be expanded to absorb large quantities of synthetics in addition to the natural production. *T* *Fh Ha.25.361*

Geological structure and deposits of the Congo Republic. Geologische Struktur und Lagerstätten der Republik Kongo

Anon. *Bergbautechnik* 1961 Vol 11 (3) pp 114-121 (Mar) (In German)

Among the many important deposits in this area are diamonds, and it is claimed that in 1958, 75% of the world's production of industrial diamonds came from the Congo Republic. The percentage of gem diamonds is much smaller. The article includes a map which illustrates the situation and extent of these deposits, and recent production figures are given. 2 illustr, 10 ref, 1 table. *A* *Eb.365*

British Guiana

Anon. *Overseas Geology and Mineral Resources* 1961 Vol 8 (2) pp 204-207

Although there is a steady production of diamonds from the Amerindian Reservation in the Upper Mazaruni District of British Guiana, no large quantities appear to be available, according to an investigation. *D* *Eb F.13.3474*

Diamond : Sierra Leone

Anon. *Miner Tr Notes* 1961 Vol 52 (5) pp 10-11 (May)

Diamond exports from Sierra Leone for 1958-1960 indicate an increase over the period said to be due mainly to fairer prices paid to diamond operators since August 1959 when the Government Diamond Office was established. *D* *F.251.3672*

Industrial diamonds

L. M. Van Moppes & Sons, Basingstoke. *Wire Industry* 1961 Vol 28 (329) p 472 (May)

At the British Trade Fair in Moscow a large selection of loose industrial diamonds, diamond tools, drill bits, oil bits, diamond lapping powder and compound were exhibited by L. M. Van Moppes & Sons. The firm is hoping to re-establish it's once very considerable trade with Russia, it is stated. *D* *Fc.27/N.27*

The diamond industry in 1958 and 1959. Die Diamant-Industrie in den Jahren 1958 und 1959

A. Moyar. *Dtsch Goldschmiede Ztg* 1961 Vol 59 (5) pp 285-287 (May) (In German)

The article reviews briefly world diamond production with particular reference to Russia. Diamond trading, one diamond grinding industry, and industrial diamonds are also considered. 1 illustr, 2 tables. *A* *F.25.31.52*

The diamond industry

H. F. Oppenheimer. *S Afr Min Engng J* 1961 Vol 72 (1) pp 847-851 (Apr 21)

The growth of the De Beers company, which markets 80-85% of world production, is outlined. The need for stability in the industry is emphasised, and the way in which this is achieved is described. Contrary to popular belief the demand for industrial diamonds tends to fluctuate more widely than that for gems. *D* *F.25.361*

Record sales of diamonds for first quarter of 1961. Revision of selling procedure announced by De Beers Co

De Beers Consolidated Mines Ltd. *Diamond News* 1961 Vol 24 (7) p 9 (Apr)

Be Beers Co have announced the revision of their selling procedure. Therefore, henceforward the practice of announcing the quarterly sales of gem and industrial stones in sub-divisions, is to be discontinued. In future, only the total net sales of all classes of diamonds will be announced. This revision of selling procedure, therefore, has had the effect of invalidating any comparison between current and earlier sales of gems and industrials. *T* *F.251.361*

How De Beers controls the diamond market

V. Philibert. *Swiss Watch and Jewelry Journal* 1961 (2) pp 237-242 (Apr)

A brief survey of the organisation of the Diamond Corporation and the marketing of diamonds. 3 illustr, 3 tables. *A* *F.251.31*

Diamond content of the Czech massif

L. Kopecky. *Izv Akad Nauk SSSR Ser geol* 1960 (12) p 52 ; *Insdoc List* 1961 Vol 8 (6) p 496 (Mar 16)

X *Eb.326*

Experimental method of determining the minimum volume in samples of diamondiferous Kimberlite. Méthode expérimentale de détermination du volume minimal des échantillons de Kimberlite diamantifére

F. Gricenko. *Prosp prot sous-sol* 1960 No 10 pp 5-14 (Oct) (In French) (Original in Russian)

A team from the Institute of Geological Prospecting in Moscow has undertaken extensive tests in the Yakuts area, and used three different methods of sampling in order to find a satisfactory one. The methods and results are discussed. 3 illustr, 4 ref, 5 tables. *A* *Ebb Hz.1456*

Gemstones of India

C. K. Zaveri. *Gemmologist* 1961 Vol 30 (356) pp 46-52 (Mar)

Diamond deposits in India, past and present, are discussed. India, unlike South Africa, possesses no pipe mines. Today mining only takes place at Panna, in Vindhya Pradesh and on the river bed of the Kistna, in Andhra State of South India. Output is, however, very small at the present time but the author believes that further exploitation of these existing deposits could bring better results. 1 map. *T* *Eb.12.371*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND

Colour and artificial colouration of diamond (3). Farbe und künstliche Farveränderung von Diamanten (3)

Anon. *Dtsch Goldschmiede Ztg* 1961 Vol 59 (4) pp 204-207 (Apr) (In German)

The neutron irradiation process, the most important method used today for the colouration of diamond, is described fully, and the results are discussed. The absorption spectra of natural and treated diamonds are compared, and distinguishing features are considered. 8 illustr. *A* *F Hx/Cb*

Colour and artificial colouration of diamond (concluded) ; Farbe und künstliche Farbveränderung von Diamanten (schluss)

E. Gübelin. *Dtsch Goldschmiede Ztg* 1961 Vol 59 (5) pp 282-285 (May) (In German)

Investigations into natural and artificially coloured blue diamonds led to the discovery that natural blue diamonds belong to a class of their own, now known as IIb, and have been found to be semi-conductors of electricity. Their reaction to ultra-violet light and to heat are discussed. Natural blue diamonds are said to be more stable than artificially coloured stones. 6 illustr, 61 ref.

A *F Gba*F Hx*

Heat treated diamonds ?

A. Ashburn. *Amer Mach* 1961 Vol 105 (9) pp 82-84 (May 1)

Tabulated summary of test results obtained by C. W. Highberg, Engelhard Hanovia, in comparing the carbide grinding efficiency of synthetic diamonds, natural diamonds, selected natural diamonds (SND), and heat-treated SND ; all test wheels were resin-bonded.

In a comparison of medium and coarse grit wheels in the four categories under test, it was found that heat-treated SND had the highest efficiency of the medium grits (120-200 mesh), and synthetic diamonds were superior in coarse grit (100 mesh) wheels.

In a test of cup wheels, in which the set-up simulated milling cutter grinding, synthetic diamond wheels very narrowly outperformed SND treated and untreated wheels.

When peripheral grinding with 5 in. wheels there was found to be a greater difference between the efficiency ratios of the four types of diamond at 0.001 in. downfeed than at greater downfeeds. At 0.001 in., 0.002 in., and 0.003 in. downfeed, natural diamond showed the best efficiency, whilst synthetics were best when table speed was stepped from 45 to 55 ft/min., and SND treated wheels were best when crossfeed was advanced from 0.035 to 0.050 inch. In peripheral grinding with coarse grits the SND treated diamonds were most efficient. Highberg feels that the optimum results for grinding carbide with diamond will not be achieved until the most effective grinding conditions, *eg* table speed, can be established.

Dr. Michael Seal, Engelhard Hanovia, discards the theory that the improved performance of heat-treated diamonds derives from increased friability. He favours the theory that the layer of graphitic carbon, imparted to the diamond during heat-treatment, improves the adhesion between the diamonds and their resin bond.

Details of the heat-treatment process are not known, but it is believed to consist of quenching diamonds which have first been heated to above 1400° C in an oxygen-free atmosphere. 6 tables.

W *Bk Chc Kmf*Bk Chc Kl*Bk Chc Kl:Hz*

Natural diamond grit has block-shaped, longer lasting, grains to give smoother cutting characteristics

Diamond Tool Research Co Inc, New York. *Purchasing Week* 1961 Vol 4 (19) p 23 (May 8)

Uniformity permits closer grading of this grit which is suited for the heavy grinding and cutting pressures experienced on grinding wheels and saws.

D *Ceg Kl/Chc Kl*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate journal if this is an American publication.

Industrial diamonds. Work of the Diamond Research Lab

Anon. *Petroleum, Lond* 1961 Vol 65 (1662) p 282 (Apr 21)

Describes some of the investigations, made by the Diamond Research Lab in Johannesburg, into the use of diamonds in industry — in machining, grinding, sawing, drilling and honing operations. In particular, recent tests have been made on the correct orientation of stones in the diamond tool and on rock drill bits, and actual working conditions are always kept in mind. It has also been shown that increased drilling efficiency is obtained when diamonds are rounded and polished by special processes. When such diamonds have been tested in the field, they have drilled approx 80% further than those before treatment. The usefulness of such tests saves time in the oil-field, *eg* by securing faster penetration of various formations, and also gives drilling tools a longer life.

T *Ceq N.131*

Effect of diamond grit size on rms finish ?

A. Rakestraw. *Grinding & Finishing* 1961 Vol 7 (4) p 31 (Apr)

Q : What rms finishes are attainable with diamond grit of various sizes in abrasive wheels ?

A : These can be roughly assessed on the basis of 150 mesh = 10 rms, and 320 mesh = 5 rms.

W *Ceq Kl Unf*

Discourse on diamonds

Anon. *Gemmologist* 1961 Vol 30 (356) pp 59-60 (Mar)

Sir G. Sutherland told the Royal Institution in London that synthetic diamonds were being produced in the USA, Sweden, and South Africa. The NPL, too, had been conducting promising experiments with high-pressure equipment.

Natural diamonds fell broadly into two classes that differed in such properties as their reaction to electricity — conductors or insulators — their possible use as nuclear radiation detectors and the existence of nitrogen as an impurity in the more common of the two classes. Other points discussed were colouration by radiation and theories concerning the question of diamond in meteorites. A display of diamonds, diamond tools, mining procedure and synthetic production equipment was supplied by the Industrial Diamond Information Bureau, De Beers, and the National Physical Laboratory.

T *Eg.21/F Hx/F U/Fh Ha*

Natural diamond grit

Diamond Tool Research Co, Inc, NY. *Tooling and Prodn* 1961 Vol 27 (1) p 116 (Apr)

The new " pressure tested " diamond grit is said to be one of the most important developments in natural diamonds. It is said to promise long life and efficiency in grinding wheels or saws or where heavy cutting or grinding pressures are essential. Sound, blocky grits are extracted from the rough diamonds by the exertion of extreme pressures. 1 illustr.

T *Kl Ng/Kl Nv*

Pressure-tested diamonds

Diamond Tool Research Co, Inc, NY. *Mach Tool Blue Bk* 1961 Vol 56 (5) pp 196-197 (May)

The Diamond Tool Research Co employ extreme pressures, under precise control, in order to break rough diamonds into sound, blocky grits. Mined. natural diamonds are the source of such pressure-tested grits. 1 illustr.

T *Fb Hvb Kl*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF HARD MATERIALS

Milling cutters rough, finish

Wesson Co, 1220 Woodward Heights Blvd, Ferndale 20, Mich. *Tool & Mfg Engr* 1961 Vol 46 (5) p 128 (Apr)

Designed for either roughing or finishing of cast iron where high speeds and feeds are required, the series 7100 Rigidcut face mill has large brazed-on carbide blades. They are available from 6 to 20 in. diameters in 1 in. increments. 1 illustr.

D *Bfcab Ceq Pdc*

Solid carbide drills cut space-age metals

Atrax Co, Newington 11, Conn. *Tool & Mfg Engr* 1961 Vol 46 (5) p 142 (Apr)

This line of solid carbide Hi-Ten drills, series 1806, is suited for drilling high tensile alloys and steels. Available in 29 fractional sizes graduated in 1/64 inch increments from 1/16 to ½ inch, they drill hardened steel to RC 65 and exotic metals, high-tensile alloys and high-temperature alloys to RC 56. 1 illustr.

D *Bf Cfb Pl Rg*

Take a good look at ceramics

W. M. Wheldon. *Machinery, NY* 1961 Vol 67 (9) pp 114-123 (May)

The article examines ceramic cutting tools and their application today and examines their prospects which seem to be favourable. Although current prices show carbides to be roughly half the cost it is speculated that ceramics will be cheaper when marketed on a large scale. 6 illustr, 3 tables.

D *Pdd.1451/Pdd.251*

What's new in the world : Hard-tipped tools

Anon. *Financial Times* 1961 (22400) p 15 (May 26)

As a result of a novel method of producing powdered alumina in ultra-fine form it is stated that high grade ceramic-tipped tools and metal working dies of exceptional durability are manufactured in Hungary.

D *Pdd Qc.329/Pxz Qc.329*

What is steel-bonded carbide ?

K. J. A. Brookes. *Metalworking Prod* 1961 Vol 105 (19) pp 65-67 (May 10)

Steel-bonded carbide has properties between tool steels and conventional sintered carbides, therefore press dies in particular, it is claimed, can be made which neither wear rapidly as when made from tool steel nor are so expensive and time consuming as when made from tungsten carbide. 4 illustr.

D *Pdb U*Pdc U*Pdcz U*

Developments to watch . . . : New ceramic for high temperature uses

Anon. *Prod Engng* 1961 Vol 32 (16) p 9 (Apr 17)

A lithium aluminium silicate refractory is claimed to have excellent resistance to heat shock, low thermal expansion and Fair mechanical strength. It is said to be able to stand rapid cycling to 1900° F followed by immersion in cold water. *D* *Rp Ud*

Cemented [sintered] tungsten carbides that are shock and wear resistant

Allegheny Ludlum Steel Corp, Carmet Div, Pittsburg, Pa. *Machinery, NY* 1961 Vol 67 (8) p 158 (Apr)

Three sintered tungsten carbides, CA-704, CA-711 and CA-720 can handle jobs ranging from fine finishing and precision boring to heavy and interrupted boring, said to extend tool life up to 200 per cent.

D *Ceq Pdc Uqe*

Case history : Disposable inserts = savings

R. D. Zimmerman. *Cutting Tool Engng* 1961 Vol 13 (4) pp 16-19 (Apr)

Although tool changes are doubled using disposable sintered carbide inserts as compared with single point brazed tools, job times are, it is claimed, halved and tool costs are even so reduced. Besides large industrial concerns it is stated that small shops can benefit by using disposable inserts as if they do not use them, they must invest in diamond wheels and grinding equipment or have the tools sent out for re-sharpening or re-brazing which can be a costly business. 2 illustr, 4 tables. *D* *Al Bkc Chc Nv/Pdc*Pdcb*

Standardization of multiple edge tool dimensions. Vereinheitlichung der Abmessungen von Wende-schneidplatten

H. Cornely. *Werkstattstechnik* 1961 Vol 51 (6) pp 311-314 (June) (In German)

Sintered carbide multiple edge tools have been familiar for some years now and have been instrumental in reducing the cost of mass production. The use of ceramics for these tools has increased their importance and the article discusses an attempt to introduce standard dimensions. 6 illustr.

K *Pdcz.255/Pddz.255*

The diamond pyramid hardness of sodium borate glasses as a function of their composition and heat treatment. La dureté au diamant pyramidal (DPH) des verres sodoboriques en fonction de leur composition et de leur traitement thermique

F. C. Eversteijn, J. M. Stevels, H. I. Waterman. *Phys Chem of Glasses* 1960 pp 134-136 (Aug); Anon. *Verres et Refr* 1961 Vol 15 (2) p 84 (Mar-Apr) (In French) (Original in English)

6 ref, 2 tables. *A* *Bmz Unhcc*

Carbide tooling lines

Sandvik Steel, Inc, Fair Lawn, NJ, USA. *Mach Tool Blue Bk* 1961 Vol 56 (5) p 221 (May)

Describes the various carbide tool lines manufactured by Sandvik. These include the Coromant carbide-tipped shell end mill and the T-max disposable tool-holders. *T* *Pdc*

Boron : Synthesis, structure and properties. (Proceedings of a conference on Boron at Asbury Park, New Jersey, Sept. 1959)

J. A. Kohn, W. F. Nye and G. K. Gaule (Editors). Book 1960, 189 pp. Plenum Press Inc, New York. $8.50; *Bull Brit non-ferr Met Ass* 1961 Vol 41 (382) p 198 (May)

X *Rf U.231/Rfz.231*

Carbide drills for printed circuits

Starlite Industries Inc, Philadelphia, Pa, USA. *Mach Tool Blue Bk* 1961 Vol 56 (5) pp 194-195 (May)

Starlite Industries have introduced three new products. These include a drill for producing clean, burr-free holes without halo, a carbide end mill for milling high alloy steels, and a carbide burr for non-ferrous metals. 2 illustr. *T* *Pl Rg*

Three carmet cemented [sintered] tungsten carbides said to increase tool life up to 200%

Carmet Div, Allegheny Ludlum Steel Corp, Oliver Bldg, Pittsburgh 22, Pa, USA. *Amer Mach* 1961 Vol 105 (7) p 123 (Apr 3)

Shock resistance and long wearing ability are said to be combined in the three new grades of sintered tungsten carbide. It is stated that these grades, the 700-series, are able to increase tool life up to 200 per cent.

T *Rhb U*

Five new grades of cemented [sintered] carbides

Newcomer Products Inc, Latrobe, Pa. *Mach Tool Blue Bk* 1961 Vol 56 (4) p 254 (Apr)

Five new grades of sintered carbide, called NewBide, with a Rockwell (A) hardness ranging from 91.2 to 93.0, have been developed. Each is designed for a specific application. *D* *Rh.2552*

DIAMOND, ETC, IN INSTRUMENTS

Diamond cutting wheels

Navan Products Inc, 900 N Sepulveda, El Segundo, Calif. *Cutting Tool Engng* 1961 Vol 13 (4) p 35 (Apr)

An illustration of a Navonic diamond cutting wheel is given, no details are available. 1 illustr.
D *Nvc*

Portable instrument measures finishes of 1 to 1000 micro-in

Brush Instruments, Div of Olevite Corp, 37th at Perkins, Cleveland 14, Ohio. *Amer Mach* 1961 Vol 105 (8) p 161 (Apr 17)

The MS 100 Surfindicator measures surface finishes from 1 to 1000 micro-inches. The sapphire stylus tip incorporates a transducer element which generates a current proportional to surface variations. Wavelength cut-off devices eliminate the possibility of errors arising from surface waviness. 1 illustr.
W *Tdb Unf Wgf*

Tracer template makes simple work of contour planing

L. C. Wilkerson. *Amer Mach* 1961 Vol 105 (7) p 118 (Apr 3)

An improved method of contour planing, using a tracing template, is described. 1 illustr.
T *Cemz Puz*

HARDNESS, WEAR TESTING, AND PRECISION GAUGING

Photographic technique for the determination of metal cutting temperatures

G. Boothroyd. *Brit J Appl Phys* 1961 Vol 12 (5) pp 238-242 (May)

This experimental technique, basically evolved because it is thought that temperatures existing at the wearing surfaces of a tool are closely related to tool wear, measures the temperature distribution in the deformation zone and in the chip and tool. 9 illustr, 10 ref. *D* *Bf Ceg Vb.21*

Verification of low loads in hardness testing

R. J. Ellis. *J sci Instrum* 1961 Vol 38 (3) p 105 (Mar); *Instrum Abstr* 1961 Vol 16 (5) p 413 (May)

An instrument for verifying a 1 kg load for hardness testing machines is described.
M *Cv Pr W*

Measurement of the wear of grinding disks

M. R. Besser. *Measurement Tech* 1960 (1) p 21 (Jan); *Instrum Abstr* 1961 Vol 16 (5) p 409 (May)

Pe Unr Vfd

How to improve tracer lathe accuracy, Part 1—Part check

J. Bryan, J. Bowerbank, E. Holland, O. Mohl. *Tool & Mfg Engr* 1961 Vol 46 (5) pp 64-68 (Apr)

The article describes tracer lathe operation and potential sources of error are explained. The part check measures how accurately the non-lathe elements function. 7 illustr. *D* *Ceqbz Pr*

Pneumatic measuring. Misurazione pneumatica

Anon. *G Officina* 1961 Vol 6 (8) pp 7-8 (Apr 30) (In Italian)

Control and regulating devices of tools on automatic machines, including various types of grinders, *eg* internal, cylindrical and centreless are described. 7 illustr. *M* *Chc Prs Wpz*

Skins for protecting surfaces produced by galvano-technical and chemical means in light metal machining especially with regard to aviation design. Galvanische und chemisch erzeugte Oberflächen-Schutzschichten im Leichtmetallbau unter besonderer Berücksichtigung des Flugzeugbaues

G. Elsner. *Industrieblatt* 1961 Vol 61 (5) pp 286-301 (May) (In German)

The hardness testing of some of these surfaces is done with a Vickers diamond, and two illustrations show some especially fine indentations. 17 illustr, 1 table.
M *Cvd Nde*

Automatic calibration in grinding. Le calibrage automatique en rectification

E. Reiber. *Industr Mécan* 1960 Vol 46 (5) pp 129-133 (May) (In French)

The use of an automatic device is shown to have many advantages; one of the disadvantages is that, after diamond dressing of the wheel, the machine must be re-set for the final operation. 13 illustr, 1 table.
A *Chc Pr Psf:Nj Qdd.133*

How to improve tracer lathe accuracy: Part 2—lathe check

J. Bryan, J. Bowerbank, E. Holland, O. Mohl. *Tool and Mfg Engr* 1961 Vol 46 (6) pp 93-97 (May)

The twin disk check measures how accurately the lathe servo system and lathe slider operate to regenerate the template bearing surface path at the tool compound. The single disk check measures how accurately the servo system holds the frame of the transducer to the path of the locus curve being traced by the stylus of the transducer, the spindle check measures spindle axis displacement and another check measures the template carrier orientation with respect to the spindle axis and to the slide's plane of travel. 5 illustr.
D *Ceqb Pr Wb*

Helix angle tester

VEB Carl Zeiss, Jena. *Machinery, Lond* 1961 Vol 98 (2531) pp 1125-1126 (May 17)

Designed for testing the helix angles of gear teeth of 1.5 to 20 module, with face widths exceeding 0.78 in., readings to 5 sec of arc can be made, it is said, with this instrument. A special form of the instrument, fitted with a bubble level instead of a straight edge, can be supplied for use on such tools as gear grinders. 1 illustr. *D* *Ad Chc Pr Psc*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF HARD MATERIALS

Milling cutters rough, finish

Wesson Co, 1220 Woodward Heights Blvd, Ferndale 20, Mich. *Tool & Mfg Engr* 1961 Vol 46 (5) p 128 (Apr)

Designed for either roughing or finishing of cast iron where high speeds and feeds are required, the series 7100 Rigidcut face mill has large brazed-on carbide blades. They are available from 6 to 20 in. diameters in 1 in. increments. 1 illustr.

D *Bfcab Ceq Pdc*

Solid carbide drills cut space-age metals

Atrax Co, Newington 11, Conn. *Tool & Mfg Engr* 1961 Vol 46 (5) p 142 (Apr)

This line of solid carbide Hi-Ten drills, series 1806, is suited for drilling high tensile alloys and steels. Available in 29 fractional sizes graduated in 1/64 inch increments from 1/16 to ½ inch, they drill hardened steel to RC 65 and exotic metals, high-tensile alloys and high-temperature alloys to RC 56. 1 illustr.

D *Bf Cfb Pl Rg*

Take a good look at ceramics

W. M. Wheldon. *Machinery, NY* 1961 Vol 67 (9) pp 114-123 (May)

The article examines ceramic cutting tools and their application today and examines their prospects which seem to be favourable. Although current prices show carbides to be roughly half the cost it is speculated that ceramics will be cheaper when marketed on a large scale. 6 illustr, 3 tables.

D *Pdd.1451/Pdd.251*

What's new in the world : Hard-tipped tools

Anon. *Financial Times* 1961 (22400) p 15 (May 26)

As a result of a novel method of producing powdered alumina in ultra-fine form it is stated that high grade ceramic-tipped tools and metal working dies of exceptional durability are manufactured in Hungary.

D *Pdd Qc.329/Pxz Qc.329*

What is steel-bonded carbide ?

K. J. A. Brookes. *Metalworking Prod* 1961 Vol 105 (19) pp 65-67 (May 10)

Steel-bonded carbide has properties between tool steels and conventional sintered carbides, therefore press dies in particular, it is claimed, can be made which neither wear rapidly as when made from tool steel nor are so expensive and time consuming as when made from tungsten carbide. 4 illustr.

D *Pdb U*Pdc U*Pdcz U*

Developments to watch . . . : New ceramic for high temperature uses

Anon. *Prod Engng* 1961 Vol 32 (16) p 9 (Apr 17)

A lithium aluminium silicate refractory is claimed to have excellent resistance to heat shock, low thermal expansion and Fair mechanical strength. It is said to be able to stand rapid cycling to 1900° F followed by immersion in cold water. *D* *Rp Ud*

Cemented [sintered] tungsten carbides that are shock and wear resistant

Allegheny Ludlum Steel Corp, Carmet Div, Pittsburg, Pa. *Machinery, NY* 1961 Vol 67 (8) p 158 (Apr)

Three sintered tungsten carbides, CA-704, CA-711 and CA-720 can handle jobs ranging from fine finishing and precision boring to heavy and interrupted boring, said to extend tool life up to 200 per cent.

D *Ceq Pdc Uqe*

Case history : Disposable inserts = savings

R. D. Zimmerman. *Cutting Tool Engng* 1961 Vol 13 (4) pp 16-19 (Apr)

Although tool changes are doubled using disposable sintered carbide inserts as compared with single point brazed tools, job times are, it is claimed, halved and tool costs are even so reduced. Besides large industrial concerns it is stated that small shops can benefit by using disposable inserts as if they do not use them, they must invest in diamond wheels and grinding equipment or have the tools sent out for re-sharpening or re-brazing which can be a costly business. 2 illustr, 4 tables. *D* *Al Bkc Chc Nv/Pdc*Pdcb*

Standardization of multiple edge tool dimensions. Vereinheitlichung der Abmessungen von Wendeschneidplatten

H. Cornely. *Werkstattstechnik* 1961 Vol 51 (6) pp 311-314 (June) (In German)

Sintered carbide multiple edge tools have been familiar for some years now and have been instrumental in reducing the cost of mass production. The use of ceramics for these tools has increased their importance and the article discusses an attempt to introduce standard dimensions. 6 illustr.

K *Pdcz.255/Pddz.255*

The diamond pyramid hardness of sodium borate glasses as a function of their composition and heat treatment. La dureté au diamant pyramidal (DPH) des verres sodoboriques en fonction de leur composition et de leur traitement thermique

F. C. Eversteijn, J. M. Stevels, H. I. Waterman. *Phys Chem of Glasses* 1960 pp 134-136 (Aug); Anon. *Verres et Refr* 1961 Vol 15 (2) p 84 (Mar-Apr) (In French) (Original in English)

6 ref, 2 tables. *A* *Bmz Unhcc*

Carbide tooling lines

Sandvik Steel, Inc, Fair Lawn, NJ, USA. *Mach Tool Blue Bk* 1961 Vol 56 (5) p 221 (May)

Describes the various carbide tool lines manufactured by Sandvik. These include the Coromant carbide-tipped shell end mill and the T-max disposable tool-holders. *T* *Pdc*

Boron : Synthesis, structure and properties. (Proceedings of a conference on Boron at Asbury Park, New Jersey, Sept. 1959)

J. A. Kohn, W. F. Nye and G. K. Gaule (Editors). Book 1960, 189 pp. Plenum Press Inc, New York. $8.50; *Bull Brit non-ferr Met Ass* 1961 Vol 41 (382) p 198 (May)

X *Rf U.231/Rfz.231*

Carbide drills for printed circuits

Starlite Industries Inc, Philadelphia, Pa, USA. *Mach Tool Blue Bk* 1961 Vol 56 (5) pp 194-195 (May)

Starlite Industries have introduced three new products. These include a drill for producing clean, burr-free holes without halo, a carbide end mill for milling high alloy steels, and a carbide burr for non-ferrous metals. 2 illustr. *T* *Pl Rg*

Three carmet cemented [sintered] tungsten carbides said to increase tool life up to 200%

Carmet Div, Allegheny Ludlum Steel Corp, Oliver Bldg. Pittsburgh 22, Pa, USA. *Amer Mach* 1961 Vol 105 (7) p 123 (Apr 3)

Shock resistance and long wearing ability are said to be combined in the three new grades of sintered tungsten carbide. It is stated that these grades, the 700-series, are able to increase tool life up to 200 per cent.

T *Rhb U*

Five new grades of cemented [sintered] carbides
Newcomer Products Inc, Latrobe, Pa. *Mach Tool Blue Bk* 1961 Vol 56 (4) p 254 (Apr)

Five new grades of sintered carbide, called NewBide, with a Rockwell (A) hardness ranging from 91.2 to 93.0, have been developed. Each is designed for a specific application. *D* *Rh.2552*

DIAMOND, ETC, IN INSTRUMENTS

Diamond cutting wheels
Navan Products Inc, 900 N Sepulveda, El Segundo, Calif. *Cutting Tool Engng* 1961 Vol 13 (4) p 35 (Apr)

An illustration of a Navonic diamond cutting wheel is given, no details are available. 1 illustr.
D *Nvc*

Portable instrument measures finishes of 1 to 1000 micro-in
Brush Instruments, Div of Olevite Corp, 37th at Perkins, Cleveland 14, Ohio. *Amer Mach* 1961 Vol 105 (8) p 161 (Apr 17)

The MS 100 Surfindicator measures surface finishes from 1 to 1000 micro-inches. The sapphire stylus tip incorporates a transducer element which generates a current proportional to surface variations. Wavelength cut-off devices eliminate the possibility of errors arising from surface waviness. 1 illustr.
W *Tdb Unf Wgf*

Tracer template makes simple work of contour planing
L. C. Wilkerson. *Amer Mach* 1961 Vol 105 (7) p 118 (Apr 3)

An improved method of contour planing, using a tracing template, is described. 1 illustr.
T *Cemz Puz*

HARDNESS, WEAR TESTING, AND PRECISION GAUGING

Photographic technique for the determination of metal cutting temperatures
G. Boothroyd. *Brit J Appl Phys* 1961 Vol 12 (5) pp 238-242 (May)

This experimental technique, basically evolved because it is thought that temperatures existing at the wearing surfaces of a tool are closely related to tool wear, measures the temperature distribution in the deformation zone and in the chip and tool. 9 illustr, 10 ref. *D* *Bf Ceg Vb.21*

Verification of low loads in hardness testing
R. J. Ellis. *J sci Instrum* 1961 Vol 38 (3) p 105 (Mar); *Instrum Abstr* 1961 Vol 16 (5) p 413 (May)

An instrument for verifying a 1 kg load for hardness testing machines is described.
M *Cv Pr W*

Measurement of the wear of grinding disks
M. R. Besser. *Measurement Tech* 1960 (1) p 21 (Jan); *Instrum Abstr* 1961 Vol 16 (5) p 409 (May)
M *Pe Unr Vfd*

How to improve tracer lathe accuracy, Part 1—Part check
J. Bryan, J. Bowerbank, E. Holland, O. Mohl. *Tool & Mfg Engr* 1961 Vol 46 (5) pp 64-68 (Apr)

The article describes tracer lathe operation and potential sources of error are explained. The part check measures how accurately the non-lathe elements function. 7 illustr. *D* *Ceqbz Pr*

Pneumatic measuring. Misurazione pneumatica
Anon. *G Officina* 1961 Vol 6 (8) pp 7-8 (Apr 30) (In Italian)

Control and regulating devices of tools on automatic machines, including various types of grinders, *eg* internal, cylindrical and centreless are described. 7 illustr. *M* *Chc Prs Wpz*

Skins for protecting surfaces produced by galvano-technical and chemical means in light metal machining especially with regard to aviation design. Galvanische und chemisch erzeugte Oberflächen-Schutzschichten im Leichtmetallbau unter besonderer Berücksichtigung des Flugzeugbaues
G. Elsner. *Industrieblatt* 1961 Vol 61 (5) pp 286-301 (May) (In German)

The hardness testing of some of these surfaces is done with a Vickers diamond, and two illustrations show some especially fine indentations. 17 illustr, 1 table.
M *Cvd Nde*

Automatic calibration in grinding. Le calibrage automatique en rectification
E. Reiber. *Industr Mécan* 1960 Vol 46 (5) pp 129-133 (May) (In French)

The use of an automatic device is shown to have many advantages; one of the disadvantages is that, after diamond dressing of the wheel, the machine must be re-set for the final operation. 13 illustr, 1 table.
A *Chc Pr Psf:Nj Qdd.133*

How to improve tracer lathe accuracy: Part 2—lathe check
J. Bryan, J. Bowerbank, E. Holland, O. Mohl. *Tool and Mfg Engr* 1961 Vol 46 (6) pp 93-97 (May)

The twin disk check measures how accurately the lathe servo system and lathe slider operate to regenerate the template bearing surface path at the tool compound. The single disk check measures how accurately the servo system holds the frame of the transducer to the path of the locus curve being traced by the stylus of the transducer, the spindle check measures spindle axis displacement and another check measures the template carrier orientation with respect to the spindle axis and to the slide's plane of travel. 5 illustr.
D *Ceqb Pr Wb*

Helix angle tester
VEB Carl Zeiss, Jena. *Machinery, Lond* 1961 Vol 98 (2531) pp 1125-1126 (May 17)

Designed for testing the helix angles of gear teeth of 1.5 to 20 module, with face widths exceeding 0.78 in., readings to 5 sec of arc can be made, it is said, with this instrument. A special form of the instrument, fitted with a bubble level instead of a straight edge, can be supplied for use on such tools as gear grinders. 1 illustr. *D* *Ad Chc Pr Psc*

LITERATURE REQUESTS
When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

USP 2,956,432 (July 30, 1956) **K. E. Henrikson**

Material Hardness Detector

A portable device for making indentations in a sample of metal for determining the hardness thereof comprises a hydraulic pump 11, Figs 1 and 2, connected by a hose 13 to a hydraulic cylinder 40 incorporating a piston 39 and a penetrator 16 and mounted in the upper jaw 14 of a U-shaped member, the lower jaw 15

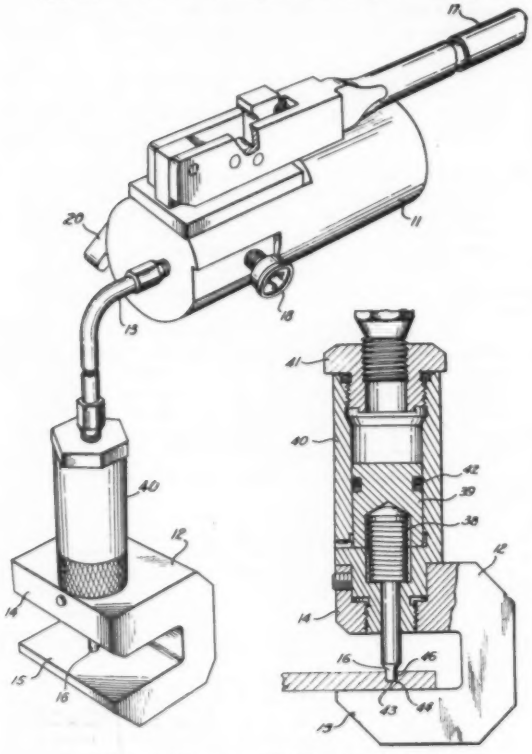


Fig 1 (left) and 2 (right). USP 2,956,432.

of which serves as an anvil for the metal sample. A spring 38 causes the piston and the penetrator to retract within the cylinder where hydraulic pressure on the piston is released. The penetrator has a vertical end portion provided with a flat horizontal face 43 so as to compact and shear the metal without crowding thereof outwardly or upwardly. 1 claim, 10 illustr. Ref cited: 7 USP. *H* *Bf Cv Wgh.545*

TRUING OF GRINDING WHEELS

Special grinder for crankshaft bearings. Spezial-Hublager-Schleifmaschine

Anon. *Die Maschine* 1961 Vol 15 (5) p 34 (May) (In German)

Finitor measuring device controls the grinding operation and the machine is equipped with a Finiform hydraulic-form truing device. 1 illustr.
M *Agn Chc Pr Psfb*

Small drills sharpened, inspected in 10 seconds on optical grinder

E. R. Bachmann Co, Inc, 27-11 41st Ave, LIC 1, NY. *Amer Mach* 1961 Vol 105 (9) pp 122-123 (May 1)

The Tatar optical drill grinder handles drills from 0.0135 to 19/32 in. diameter grinds, included point angles from 70 to 150°, and clearance angles from 0 to 40°. A built-in diamond dresser removes an predetermined amount of abrasive when the wheel is slid forward against a swivel stop. 1 illustr.
W *Alb Chc Pr Psf:Nj Wc*

Grinding machine for sharpening hobs. Maschine zum Scharfschleifen von Wälzfräsern

Anon. *Die Maschine* 1961 Vol 15 (5) pp 34-36 (May) (In German)

The accessories include a hydraulic truing device and a special device for the profiling of grinding wheels for small diameters. 2 illustr.
M *Az Chc Pr Psfb*

Centerless grinding bolts including shoulders

Anon. *Grinding & Finishing* 1961 Vol 7 (4) p 30 (Apr)

Use of a 2.C Diversimatic centreless grinder permits the production of 515 finished engine bolts/hr, with tolerances of 0.0005 inch. The side of the grinding wheel is disk dressed, and the face is diamond dressed. 1 illustr. *W* *Chcc Pr:Nj Psf*

Adjustable wheel dresser for surface grinders

Eastern Machine and Tool Co, NY. *Mach Tool Blue Bk* 1961 Vol 56 (5) p 201 (May)

The Eastern Machine and Tool Co have produced an adjustable wheel dresser that saves time and wear in the spindle by keeping the diamond in its proper position by means of three support arms. Thus, no clamp is needed. 1 illustr.
T *Chcm Pr Psf:Nj*

Production plunge-cut cylindrical grinders. Produktions-Einstech-Rundschleifmaschinen

Anon. *TZ für Praktische Metallbearbeitung* 1961 Vol 55 (5) pp 243-249 (May) (In German)

A diamond copy-turning device is described. The tracer, which traces the form of the template is connected to the truing diamond, which trues the profile on to the grinding wheel. 5 illustr.
M *Chcl Nf Pr Psf:Nj*

Czechoslovakian machine tools exhibited at the Brno Fair, 1960. Machines-outils tchecoslovaques exposées à la Foire de Brno 1960

F. Courtaud. *Mach Mod* 1961 Vol 55 (625) pp 79-82 (Apr) (In French)

The machines reviewed include the TOS Hostivar type BB 6 centreless grinder, which incorporates hydraulic diamond truing devices. 13 illustr, 2 tables.
A *Chcc Pr Psfb:Nj.27*

Sealed unit in dresser arm compensates for wear on diamond point

Briney Mfg Co, Pontiac, Mich. *Machinery, NY* 1961 Vol 67 (9) p 206 (May)

The control mechanism is said to allow adjustments of 0.0001 in. and finer without any adjusting screws. For wheel dressing, the mechanism is built in the grinding wheel dresser arm and the adjusting mechanism is connected directly to the diamond holder. Turning a calibrated knob adjusts the diamond point, thus eliminating, it is claimed, the hand trial and error methods used in making adjustments for diamond point wear while maintaining the required wheel size. 1 illustr. *E* *Nj Psf/Nj Unc*

East German machine tools at the Leipzig Fair: Automatic gauging equipment

R. E. Green. *Machinery, Lond* 1961 Vol 98 (2529) pp 1011-1012 (May 3)

The VEB Carl Zeiss, Jena automatic gauging equipment can control automatic wheel dressing by means of a device in its electrical cabinet. This action can be carried out after any number of components, from 10 to 100, have been ground. 1 illustr.

T *Ab Cg Psf.27*

New diamond tool for wheel dressing

Lazzara Co, 112 Meyerland Plaza, Houston 35, Texas. *Grinding & Finishing* 1961 Vol 7 (4) p 56 (Apr): *Mach Tool Blue Bk* 1961 Vol 56 (4) p 190 (Apr)

A new diamond dressing tool contains 150 octahedron diamonds. These are set in alternate layers of 21 and 22 in a 7/16 in. deep tungsten powder compact with a $\frac{1}{4} \times \frac{3}{8}$ in. face. The tool is recommended for wheels from 12 to 48 in. diameter, and is guaranteed to outlast a 2 ct diamond.

W *Ab Cg Nj*

Heald precision internal-grinding machine for miniature work

Heald Machine Co, Worcester, Mass. *Machinery, NY* 1961 Vol 67 (9) p 174 (May)

Among the improvements claimed for this new grinder, Model 090A, is a direct reading digital dial showing the amount of wheel life remaining at all times. Also, to speed up wheel changing, the cross slide is arranged for automatic resetting to the new wheel dressing position. 1 illustr.

E *Chcnz Pr*

Vibration analysis uncovers grinding faults

D. L. Bernhard. *Metalworking Prod* 1961 Vol 105 (19) p 69 (May 10)

Vibration analysis it is claimed improved quality and reduces rework in an American automobile plant by discovering imperfections in machines. Once these are corrected, periodic checks on the grinders enable corrections to be made before parts are spoiled.

D *Chc Pr Qn.21*

Economical truing of grinding wheels. Wirtschaftliches Abrichten von Schleifscheiben

Anon. *Werkst u betr* 1961 Vol 94 (3) pp 147-148 (Mar) (In German)

Various types of diamond truing devices are discussed. It is found that a revolving diamond placed obliquely to the wheel is more satisfactory than one that cannot be turned. A device using a number of diamonds is preferable, however, particularly for truing large wheels of cylindrical grinders. Revolving multiple-diamond devices are found to give an even better performance as heat is easily removed and the life of the diamond prolonged. 6 illustr.

A *Nj Psf.21*

Microhardness testing

V. E. Lysaght. *Metal Progr* 1960 Vol 78 (2) pp 93-97 and (3) pp 121-125 (Feb-Mar); *J Amer ceram soc* 1961 Vol 44 (4) p 97 (Apr)

Discusses the theory and applications of the Knoop and diamond pyramid hardness methods. While all the applications discussed are in the metals field, the information on the equipment, calibration, and hard- high thermal content effluent to a boule-growing zone to heat a boule-growing surface, passing feed constituents to the boule-growing zone and in the high thermal content effluent, passing the effluent to produce boule-growing material, and fusing and accumulating the material on the boule-growing surface as a crystalline boule of increasing size.

X *Cvbd Nde.1451*

A new dynamic hardness number

M. S. Drozd. *Industr Lab* 1960 Vol 26 (4) pp 509-514 (Apr); *Instrument Abstr* 1961 Vol 16 (4) p 327 (Apr)

A new dynamic hardness number is suggested and the implications are discussed in detail. 12 refs in original.

X *Cv.21*

BP 845,075 (Dec 24, 1958) **F. d'Amato, Tandemite Corp**

Dressing tools for abrasive grinding wheels

The tool is a double tool *ie* two different diamond tools. A roughing and a finishing tool are mounted on one holder so as to operate successively on the wheel face. Fig 3 and 4 show the arrangement of a cluster of five diamonds set in a soft matrix 14 at the end 11 of

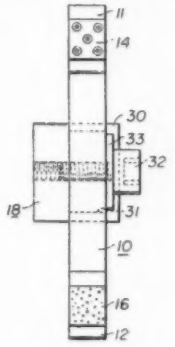
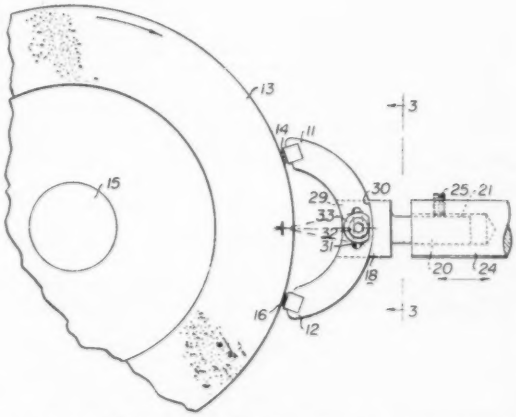


Fig 3 (above) and 4 (below). BP 845,075.



C-shaped holder 10 and hard matrix 16 impregnated with diamond particles at the other end 12. The adjustment is effected by feeding the tool towards wheel 13 and fixing it in its adopted position by screw 32 when both diamond tools contact the wheel but so that movement due to wear of the truing diamond is still possible. The diamond tool 16 (diamond filter pad) is the finishing tool. 11 claims, 3 illustr.

J *Ab Cg Nj.545*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate journal if this is an American publication.

USP 2,950,578 **E. Fouquet**
(Dec 28, 1956—conv date, France)

Grinding machine with tool dressing means

In the mill-grinding process the grinding wheel is continuously subjected to a beating operation whereby chips are chopped off the abrasive grains. This causes the removal of material in the form of metal shavings at very high speeds without modifying the technological properties of the metal. A machine adapted for this process includes dressing means and lubricant delivery at the contact points between grinding tool and dressing tool and interlinked feed motion so as to impart transverse motion to the dressing (chopping) tool along a generating line of the grinding tool to be shaped to

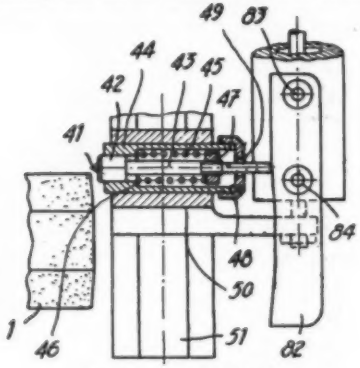


Fig 5. USP 2,950,578.

the required profile. Fig 5 is a view of the dressing device with hard point 41 reciprocated according to a generating line obtained by alternately admitting and letting off pressure fluid into either end of a cylinder reciprocating carriage 50 on slideway 51. The dressing (chopping) tool 41 is further guided by fixed cam 82 identical with the transverse profile of the grinding wheel to maintain the profile until the wheel is completely worn off. 12 claims, 8 illustr. Ref cited : 4 USP.
J

USP 2,955,587 (Aug 18, 1958) **H. Schieber**

Diamond dressing tool holder

In the dressing of grinding wheels the diamond mounting must be so supported in a holder as to permit

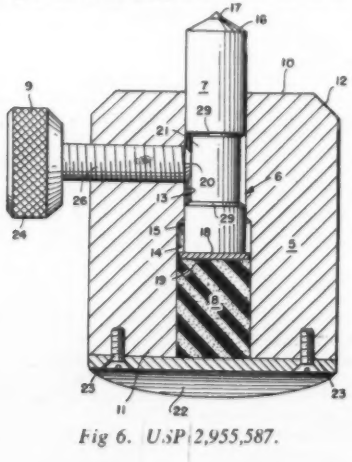


Fig 6. USP 2,955,587.

a very close adjustment of the diamond to the face of the wheel and to ensure a firm locking of the mounting in order to obtain precise results. The device illustrated in Fig 6 consists of a block 5 formed with a bore 6 for slidably supporting a diamond mounting 7 on a resilient cushion 8, the mounting being locked in axially adjusted operative position by a set screw 9 engaging a reduced annular section 21 of the mounting. The mounting 7 has a conical shaped apex 16 in which is seated a diamond 17. The sides 10, 11 of the block are non-parallel so that it is capable of being positioned at an angle on an electromagnetic table and so that the conical sides and not the point of the diamond are engaged by the grinding wheel. 1 claim, 4 illustr. Ref cited : 3 USP. *H* *Mf Nj.545*

DAS 1,087,928 (July 4, 1958) **A. Mertens, Rohde & Dörrenberg**

Device for profiling grinding wheels by means of a truing diamond. Vorrichtung zum Profilieren von Schleifscheiben mittels eines Abrichtdiamanten

Grinding wheels for relief of milling cutters, for the generating cutting of involute gear teeth, have to have a special shape which is dependent on the pitch of the cutter flutes, on the size of the grinding wheel, and on the position of the cutter, although theoretically the generating line is a straight line. The use of templates for guiding a truing diamond in predetermined curves is not feasible as the necessary shape of the grinding

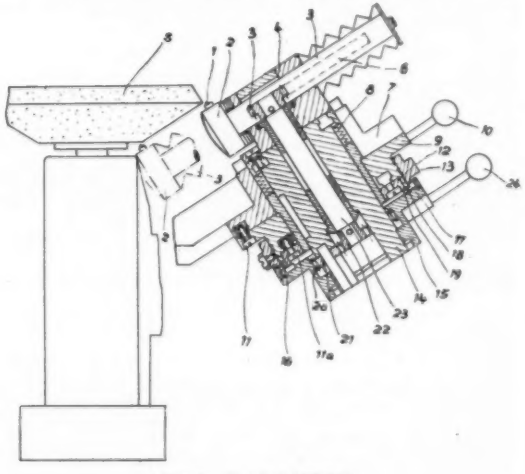


Fig 7. DAS 1,087,928.

wheel changes with its diameter and its position in relation to the cutter. As Fig 7 shows the truing diamond 1 is moved by pinion 5 and rack 6 also in a straight line. Guide 4 for the diamond holder 3 is shiftable at right angles to the movement of the holder under pressure of spring 8 this additional movement being adjustable by independently adjustable rings 9, 12, 13 with different curved faces which in combination with a cam disk 15 control the additional movement. 5 claims, 4 illustr. Ref cited : 2 USP.
J

LITERATURE REQUESTS
When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

DAS 1,086,581 **W. Darby, Stuart Davis Ltd**
(Mar 24, 1953—conv date, Gt Britain)

Device for forming and truing grinding wheels. Vorrichtung zum Formen und Abrichten von Schleifscheiben

This refers to a device for crush truing a thread grinding wheel. The adjustment of the desired angle is effected by using a sine bar on a vertical slide engaging a cross slide carrying the crushing roller. Adjustment of the sine bar may vary the amplitude of the movement of the cross slide in any degree. 3 claims, 2 illustr. Ref cited : 1 FP ; 4 BP ; 4 USP.

J *Ab Cgj Psf.545*

PRECISION MACHINING OF METALS

Effect of vibrations on the life of cutting tools

Anon. *New Sci* 1961 Vol 10 (234) p 318 (May 11)

Vibration occurring during machining operations has in the past been considered undesirable as it results in poor quality surfaces, increased tool wear and low cutting speeds. A report published in the USSR indicates however that under some conditions low-amplitude ultrasonic vibrations are actually beneficial in turning and grinding operations, increasing tool life up to three times, except in the case of sintered carbides when greater wear resulted.

D *Pd Qnf Uqe*

To the Milwaukee-Matic constant cutting is vital

D. H. Joyce. *Cutting Tool Engng* 1961 Vol 13 (4) pp 12-15 (Apr)

The Milwaukee-Matic is a tape controlled machine tool which automatically changes cutting tools and indexes the table to present more than one side of the workpiece to the cutting element. The tool magazine holds thirty tools of standard or special type according to requirements. 8 illustr.

D *Ceg Pr Wph*

Cutting tools

Wesson Co. *Tool & Mfg Engr* 1961 Vol 46 (5) p 161 (Apr)

A bulletin which describes and pictures standard and special carbide turning, milling and boring tools shows how companies can answer the question, 'Should conventional or throwaways be used ?'

D *Pd.57/Pdc*Pdcb*

Research reports of the North Rhine-Westphalia area : Investigation into the production of chips by chip breakers in machining with sintered carbide tools. Forshungsberichte des Landes Nordrhein-Westfalen : Untersuchungen der Spanformung durch Spanbrecher beim Drehen mit Hartmetallwerkzeugen

H. Opitz, H. Rohde, W. König. *Westdeutscher Verlag/Cologne and Opladen* 1960 47 pp (In German)

The increased cutting speeds that have been made possible by the use of sintered carbide tools have given rise to special problems. Amongst them are the danger to the operator, and the bad exploitation of those characteristics of sintered carbide which should be used to advantage. Various aspects of the problem are discussed in the report, and they include chip production, the possibility of greater control of chips, and the wear resistance of tools.

A *Ceg Pdc Uqfb.1313.2232*

Life tests for single point tools of sintered carbide, B.5.34

Anon. *1961 Catalog of Publications* (AM-3) p 20. Book, *Amer Soc Mech Engrs* 1956. Price $1.

This test procedure for determining tool life covers grade, shape, and size of tool material to be machined, and relationship between tool wear and cutting time.

Not in library of Industrial Diamond Information Bureau. *D* *Pdc Uqe.1341*

Shaver cutters are solid carbide

Sonnet Tool & Mfg Co, 576 N Prairie, Hawthorne, Calif. *Tool & Mfg Engr* 1961 Vol 46 (5) p 125 (Apr)

This line of weld and rivet shaver cutters can be used with many makes of weld and rivet shavers and edge mills it is claimed. Each solid carbide cutter is machine ground with a diamond wheel assisted by the low voltage electrical disintegration process. They can be resharpened many times. 1 illustr.

D *Al Bk Chc Nv*

Ultrasonic drill said twice as efficient as older model

Gulton Industries, Inc, 212 Durham Ave, Metuchen, NJ. *Amer Mach* 1961 Vol 105 (8) p 164 (Apr 17)

The D-101A Glennite ultrasonic drill is twice as efficient in multiple machining operations on hard materials as the model it supersedes. It will handle tool sizes up to ¾ in. on a diagonal, and will drill 0.002 in. diameter holes in ferrites, ceramics, and tungsten carbide. 1 illustr.

W *Bfc Cfbk Pl/Bl Cfb Pl/Bkc Cfbk Pl*

Machining aluminium and its alloys

G. Fitzgerald-Lee. *Mech World* 1961 Vol 141 (3502) pp 176-180 (May)

Specifies correct tooling materials and work conditions. Diamond tools are recommended for special finishing operations where they can produce surface finishes better than 1 micro-inch. Resin-bonded diamond wheels or hones should be used for super-finishing carbide-tipped tools. Care of diamond tools is important, and wheels should be selected and used in accordance with the manufacturer's advice. 4 tables, 1 illustr.

W *Al Bkc Chc Nv Urb/Al Bkc Chh Nv Urb*

DeVlieg cutting tool holders handle hardest carbide grades

Microbore Div, DeVlieg Machine Co, Royal Oak, Mich. *Amer Mach* 1961 Vol 105 (8) p 162 (Apr 17)

The holders are designed to handle those grades of disposable carbide edges that cannot be brazed owing to the danger of cracking. Type 3 clamp-on holders are for large bores, and type S screw-on holders are for general purpose precision boring operations. 1 illustr.

W *Bkz Cfd Psp*

East German machine tools at the Leipzig Fair : Special slicing machine for semi-conductor materials

R. E. Green. *Machinery, Lond* 1961 Vol 98 (2530) pp 1079-1080 (May 10)

A special cutting-off or slicing machine, type STAXG 125 by 500, has been produced by VEB Wergzeugmaschinenfabrik of Auerbach. Its cutting disk is of steel, with a thickness of 0.015 in., and the metal surrounding the bore is impregnated with diamond powder whereby the cutting operation is performed. 1 illustr.

T *Bde Cej Nv Pr*

Cutting head for boring and drilling machines

L. Khodov. *Tekh v sel'khoz* 1960 Vol 20 (12) pp 62-63 (Dec) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3760 (Mar) (Original in Russian)

X *Cfb Pl Pr/Cfd Plk Pr*

Osborn finishing machine

Osborn Mfg Co, Cleveland, Ohio, USA. *Mach Tool Blue Bk* 1961 Vol 56 (5) p 208 (May)

For use in high production deburring, edge blending, surface cleaning, polishing, and buffing applications. This machine is composed of a two-spindle indexing workholder and one universal finishing wheelhead. 1 illustr.

T *Chm Pr*

Russian IK62 8½-in. centre toolroom lathe

Machine Tool Agencies Ltd, 77 Portland Place, London, W 1. *Machinery, Lond* 1961 Vol 98 (2531) pp 1146-1148 (May 17)

This lathe's speeds and large capacity driving motor, it is claimed, enable tungsten carbide and ceramic tipped tools to be used to full advantage. Examples are given and its capabilities fully described. 3 illustr.

D *Ceqb Pdc Pr/Ceqb Pdd Pr*

Typical machining operations on aluminium cylinder heads

Anon. *Machinery, Lond* 1961 Vol 98 (2529) pp 1000-1005 (May 3)

9 illustr. *E* *Ag Bfg Ceq*

The OS-256 special-purpose vertical diamond boring machine

V. I. Shekhter. *Biul tekh -ekon inform* 1960 (12) pp 24-25 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3760 (Mar) (Original in Russian)

X *Cfd Nh Pr*

Milling steel and cast steel with sintered carbide cutters. Das Fräsen von Stahl und Stahlguss mit Hartmetall-Messerköpfen

Von Obering. H. Haidt. *Tech Zentralblatt für prakt Met* 1961 Vol 55 (4) pp 175-179 (Apr) (In German)

5 illustr, 7 ref, 4 tables.

A *Bfcb Cff Pdc*

Tooling for turret drilling

Anon. *Metalworking Prod* 1961 Vol 105 (18) pp 55-58 (May 3)

8 illustr. *T* *Cfb Pr:Pd*

CUTTING AND MACHINING OF STONE, GLASS, ETC.

The manufacture of precision aspheric surface

A. Cox. *J Opt Soc Amer* 1961 Vol 51 (4) p 485 (Apr)

The basic concept of the process being developed is that the shape of the surface must be accurately generated in a machining operation with such a surface texture that shape is not lost in subsequent polishing operations. Two basic types of glass machining, producing the desired results, have been devised. The first involves the turning of glass with a single point diamond in a tool of special construction. The second depends on the use of a high speed diamond burr.

D *Bm Ceq Nhh/Bm Ceqb Nf*

Kinematics of the machine for grinding and polishing plane surfaces of parts of optical instruments

N. P. Zakaznov, L. A. Malkin. *Izv vys ucheb zav ; geod i aerof* 1960 (5) pp 133-134 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3790 (Mar) (Original in Russian)

X *Bmz Chc Pr/Bmz Chm Pr*

German Industries Fair at Hanover : Dr Lehfeldt & Co

Dr. Lehfledt & Co GmbH, Heppenheim (Bergstrasse). *Engineer* 1961 Vol 211 (5496) p 882 (May 26)

The Diatron, an ultrasonic horizontal drilling machine, is fully automatic and is intended to cut or drill glass, ceramics, semi-conductors, tungsten carbide and any kind of brittle or hard material in general. 1 illustr.

D *Cfbk Prs*

A wire rope cutter

Rolled Steel Products (London) Ltd, 197 Knightsbridge, London SW 7. *Wire Ind* 1961 Vol 28 (329) p 477 (May)

Originally conceived as an all-purpose tool which, by means of various abrasive coated disks, can cut tube, pipe, solid rod, corrugated and plane sheet, alloy and stone, hard plastics, *etc*, as well as wire rope up to 3 in. diameter, the Salta cutting and grinding machine is completely portable.

D *Anz Ceg Pr*

Diamonds grind sapphire and quartz

Anon. *Grinding & Finishing* 1961 Vol 7 (4) pp 34-35 (Apr)

Centreless grinding with a 17 in. diameter Dia-Chrome diamond wheel solved the problem of how to grind small diameter sapphire and quartz rods to a concentricity and diameter tolerance of ±0.0002 inch. The smallest of the rods were 7 in. long by 0.025 in. diameter. A heavy flow of water and oil emulsion coolant keeps the diamond face free-cutting and cool, and the dimensions of the wheel have held constant during months of grinding. 2 illustr.

W *Agz Bbd Chcc Nv/Aqz Bcb Chcc Nv*

The Swiss watch and its component parts : watch glass manufacture

Anon. *Swiss Watch and Jewelry Journal* 1961 (2) pp 157-160 (Apr)

Mention is made of a watch exhibited at the Watch and Jewelry Exhibition at Geneva last year, in which a very large diamond of exceptional purity formed the glass of the watch. 3 illustr.

A *F Tlbbz*

Drilling laminated plastics without tearing

W. Thomas, S. Meyers. *Tool and Mfg Engr* 1961 Vol 46 (6) pp 103-104 (May)

The use of backing coatings of parting agent and epoxy prevents tearing of glass laminates when drill breaks through, obviating cumbersome backing materials. Countersinking was done with a diamond impregnated tool. 3 illustr.

D *Bpr Cfb/Bpr Cfp Nqg*

USP 2,949,707 (Feb 23, 1956) **D. H. Staelin**

Method and apparatus for grinding and polishing sheet glass

This is a three-stage method utilizing high frequency electro-mechanical transducers for agitating suspensions of abrasive material over the glass surface for removing material : (*i*) for pre-flattening the sheet, (*ii*) for intermediate grinding, (*iii*) for polishing the sheet under limited pressure by a form of gentle horizontal rubbing. The operation is continuous while the sheet of glass is advanced under the transversely arranged longitudinal tool heads with a liquid suspension *eg* of boron carbide particles between tool and glass surfaces. The heads are vertically vibrated but the amplitude is so small and the frequency so high that the movement is not visible. 11 claims, 10 illustr. Ref cited : 7 USP.

J *Bmz Ceq.1456.545*

USP 2,955,390 (July 20, 1956) **E. D. Phillips**

Lens grinding machine or generator

The invention relates to a machine suitable for grinding lenses of convex, concave, or plano form or compound lenses in which two or more surfaces have different radii. In this machine a diamond spindle and a lens supporting spindle are supported to be brought into coaxial alignment and means are provided whereby the diamond spindle may be swung across the axis of the lens spindle as well as being movable axially relative thereto whilst the lens spindle is supported for back and forth movement across the axis of the diamond spindle and for angular traverse with respect thereto.

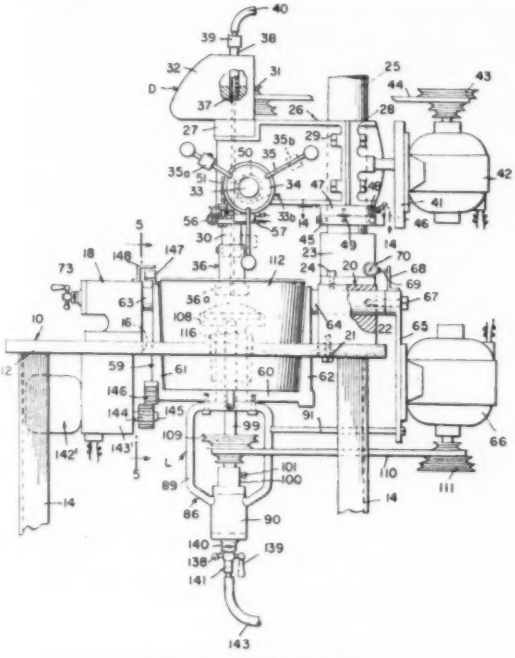


Fig 8. USP 2,955,390.

The arrangement shown in Fig 8 comprises a table 10 having an opening 16 in which is located a cradle 59 supported on trunnions 63, 64 slidably mounted in bearings 18, 20. A spindle 99 to which a lens supporting chuck 118 is secured by vacuum or magnetic means is mounted in a hanger frame 86 attached to the cradle 59. A grinding pan surrounding the chuck 103 is supported by the cradle 59. Rotation of the spindle is by means of an electric motor 66 through belt and pulley and vertical adjustment is through screw means actuated by crank 139. Horizontal adjustment of the cradle 59 and hence of the chuck 108 is by sliding the trunnions in their bearings whilst angular traverse is by means of arcuate rack 146 and pinion 144 operated by motor 142[1]. A spindle 30 carrying a diamond grinder 36a is supported by an arm 26 secured to a post 25 mounted on the bearing 20. Cooling water is supplied to the grinding head through the spindle. Rotation of the spindle is by electric motor 42. Angular adjustment of the diamond grinder is effected by rotating arm 26 about post 25 by means of a worm 46 whilst vertical adjustment is obtained through the medium of a shaft 33 rotatably supported by the arm 26 and operated either manually by a wheel 34 or automatically by a spring 50. A limit switch 57 forming part of the electrical operating circuit shuts off the motors when the lens has been ground to a pre-set thickness. 22 claims, 17 illustr. Ref cited : 13 USP.

H *Az Bm Chcn Nv Pr.545*

ROCK DRILLING

Drilling industry abroad. Die Bohrtechnik des Auslands L. I. Scraiman. *Gosgortechisdat* 1961 208SS : *Sowjetische Buchneuerscheinungen* 1961 (13) p 17

Various machines, methods, and materials are discussed, including percussion and ultrasonic drilling, construction design and materials of the drilling tools. Many examples are given of their application in the industry. *M* *Cfb Pl.25/Cfbk Pl.25*

Quiet drilling

Anon. *Financial Times* 1961 (22395) p 13 (May 19)

An electric drilling apparatus suitable for mining, quarrying and tunnelling incorporates an ultra-hard diamond bit on a drill linked directly to the electric motor shaft. Compressed air is not used, which, it is claimed, ensures quiet operation and much higher mechanical efficiency. An hydraulic device extracts the heavy shaft and bit from the bore hole.

D *Cfb Nhb/Cfb Pl*

Russian turbodrills. British firm to undertake sales

Anon. *Petroleum, Lond* 1961 Vol 65 (1662) p 282 (Apr 21)

Birwelco Ltd has recently concluded an arrangement with Russia which enables it to offer for sale Russian-made turbodrills of the latest type to all interested operators in the British Commonwealth and various other countries. *X* *Cfbd Pl.33*

Initial Mohole operation successful . . .

Anon. *World Oil* 1961 Vol 152 (5) p 7 (Apr)

First Mohole drilling operation conducted in deep water near San Diego consisting of five holes of up to 1,043 ft was successful. A 9 in. diamond core head and barrel was equipped to be adaptable to varying formation conditions encountered.

D *Bnt Cfb Nhe*

Progress in turbo drilling

Anon. *Min J* 1961 Vol 256 (6560) pp 527, 529 (May 12)

The French have evolved general purpose diamond bits suitable for turbo-drilling, and capable of penetration speeds above those normal for rotary roller cones. The average life of the diamond bits is 10 to 20 times that of roller cones, and the same bit can penetrate widely different formations, including quartzites and unconsolidated conglomerates.

W *Cfbd Nhb.132*

New products digest : Versatile drill rig

Acker Drill Co. *Engng & Min J* 1961 Vol 162 (4) p 45 (Apr)

This mobile combination core drill and auger handles all types of diamond bit coring and auger boring. It is claimed that the rig can auger to 300 ft, core drill to 1500 ft and produce holes up to 24 in. in diameter.

D *Cfb Nhe*

Scientists hope to pierce deep crust of the earth

Anon. *Diamond News* 1961 Vol 24 (7) p 21 (Apr)

Industrial Distributors (1946) Ltd, one of the De Beers associated companies, has supplied special diamonds for "Project Mohole", named after a Yugoslavian physicist, Professor Andrija Mohorovicic who first defined it, that hopes to penetrate the interior of the earth with giant, diamond-crowned drills. It is hoped to spin a drill down to 31,000 ft or more—a mile deeper than any hole ever made before. The first crown made contains 786 carats. The main point of the project is to reach the Moho, the boundary between the crust of the earth and the mantle. Outside the USA, the De Beers associates are the only organisation contributing to this scientific venture.

T *Bnt Cfb Nhg*

How to maintain maximum hydraulic horsepower at the bit

G. Boudreaux. *World Oil* 1961 Vol 152 (5) pp 91-97 (Apr)

The author examines the relationships of annular velocity and chip cleaning or particle removal to hydraulic horsepower at the bit. 10 illustr, 1 ref.

D *Pl Prx.21*

Drilling of extra-deep wells in North Pericaspian region

A. G. Gabrielan, L. N. Rosanov, R. B. Seiful-muliukov. *Insdoc List* 1961 Vol 8 (7) p 573 (Apr 1)

X *Cfb.12*

Percussive drill cuts exploration costs

B. C. Scott. *Engng & Min J* 1961 Vol 162 (4) pp 96-98 (Apr)

Long-hole percussive drilling has proved the cheapest and most satisfactory exploration method at a uranium producer in Saguache Co, Colorado. Drilling methods and equipment are described. 4 illustr.

D *Cfbf Pl.12*

Fiji

Anon. *Overseas Geology and Mineral Resources* 1961 Vol 8 (2) pp 207-208

Diamond drilling using a light-weight prospecting drill was undertaken in 1959 in the Suva region.

D *Cfb Nh.12*

3,000 carats of industrial diamonds to be used in piercing the earth's crust. 3,000 carats de diamant industriel utilisés pour le projet de percement de l'écorce terrestre

Anon. *L'Equipement mécanique* 1961 Vol 39 (19) p 104 (May-June) (Original in French)

K *Bnt Cfb Nh*

Diamond drill hole deflection

Coal Corp Ltd, Bell Island, Newfoundland. *Mindrill Bits & Pieces* 1961 Vol 14 (2) pp 4-5 (Feb)

A modified Thompson weighted-down barrel has been developed at iron ore mines in Newfoundland where normal diamond drill, retrievable wedge and arc-cutting assembly methods could not be used.

D *Cb Nh.1456.343*

Mining tools

Carmet Div, Allegheny Ludlum Steel Corp, Wanda & Jarvis St, Detroit 20, Mich. *Purchasing Week* 1961 Vol 4 (17) p 20 (Apr 24)

Booklet details 28 styles of carbide mining bits.

D *Cb Pdc.526*

WIRE DRAWING

The fundamentals of wire drawing II : The size of the pellet

C. P. Bernhoeft. *Wire Ind* 1961 Vol 28 (329) pp 481, 483-484 (May)

During this extract from the book of the same title, the author states that all wire sizes under 0.03 in. diameter should be drawn with diamonds and above with tungsten carbide dies. Theoretical and practical pellet sizes, and the reasons why they are adopted are described. 7 illustr, 2 tables.

D *An Cn Nkb/An Cn Pxb*

Special machine for hot-drawing molybdenum wire

VEB Drahtziehmaschinenwerk, Gruena, Germany. *Machinery, Lond* 1961 Vol 98 (2531) p 1124 (May 17)

On the UDZWGW/VIII/8, there is provision for a maximum of eight diamond dies, each giving a reduction in area of 13 per cent. Drawing speeds are steplessly varied from 65 to 262 ft/min. and heating is effected, by resistance with a 16V current to provide temperatures from 500 to 750 degrees. 1 illustr.

D *An Bfq Cn Nkb Pr*

GRINDING AND POLISHING OF CARBIDES AND METALS

Technology of the sharpening of mining tools with carbide-tipped blades

S. Markowski, C. Keller. *Przeglad Górniczy* 1959 (10-11) pp 529-535. *Polish Techn Abstr* 1960 Vol 3/4 (39-40) p 17

A method worked out by the Machining Institute concerning flexible sharpening of tools with carbide-tipped blades. The method consists in flexibly holding the blade ground against the surface of the abrasive disk, and in the selection of optimum cutting parameters. 18 illustr in original.

X *Al Bk Chc.1456*

External cylindrical grinding. Das Aussenrundschleifen

N. N. Wassiljew. *Sowjet Buchneuerscheinungen* 1961 (11) p 12 (Abstr in German ; original in Russian)

The author describes the main types of cylindrical grinding machines and the wheels used in cylindrical grinding, the production of machines for industry, the balancing of the grinding wheels and the processes which can be done with the aid of cylindrical grinding machines.

A *Chcl Pr*

Metallographic considerations concerning diamond-polished specimens

H. Klemm and K. Weigmann. *Werkstoffe u Korrosion* 1960 Vol 11 (12) pp 739-743 (Dec) ; *Brit non-ferr Met Ass* 1961 Vol 41 (382) p 223 (May) (Original in German ; abstr in English)

X *Bfa Chm Km*

Substitute for a diamond pin used in straightening grinding wheels

B. F. Milevskii. *Obm tekh opyt na avt transp* 1960 (4) pp 74-76 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3790 (Mar) (Original in Russian)

X *Ab Cgz Njz*

Precision machining on internal cylindrical grinders. Feinbearbeitung auf Innen-Rundschleifmaschinen

T. Ende. *TZ für Praktische Metallbearbeitung* 1961 Vol 55 (5) pp 231-236 (May) (In German)

The machines discussed include internal, external and surface grinders for the grinding of long and heavy pieces, of series of a machine part, for mass production, and roller bearings. 18 illustr.

M *Chcl Pr*

Sintered carbide and ceramic tools. Hartmetall und Oxydkeramik

Anon. *Technica* 1961 Vol 10 (11) pp 721-723 (May 26) (In German)

Both kinds of tools are compared with regard to application, cutting characteristics and grinding. Diamond grinding wheels are used for the grinding of both kinds of tools, but special attention is given to the grinding of the ceramic tools. It is claimed that the surface finish attained with ceramic tools is a shade finer than that attained with sintered carbide tools. 4 illustr, 4 tables.

M *Al Bkc Chc Nv/Al Bl Chc Nv/Pdc Unf*Pdd Unf*

Automatic polishing with liquid grinding and polishing pastes. Automatisches Polieren mit flüssigen Schleif- und Polierpasten

H. Petter. *Industr-Anzeig* 1961 Vol 83 (39) p 53 (May 16) (In German)

This method claims a great saving in polishing material, because the feeding of the paste to the polishing wheel is regulated automatically. This feeding device, it is claimed, can be adapted to all automatic or semi-automatic polishing machines. 1 illustr.

M *Chm Rdc.133.1456*

Is manually stroked 'Sunnen' honing process still up-to-date? Ist manuelles 'Sunnen'-Honen noch zeitgemäss?

B. R. McConnell, Sunnen Products. *Maschinenwelt u Electrotechnik* 1961 Vol 16 (6) pp 259-262 (May); *Grinding & Finishing* 1960 Vol 6 (10) pp 36-39 (Original in English; abstr in German)

7 illustr.

See also *Industr Diam Abstr* 1961 Vol 18 (2) p 56 (Feb). *M* *Chh.1456*

Re-use of grinding wheels can be dangerous

Anon. *Mach Tool Blue Bk* 1961 Vol 56 (5) p 236 (May)

The Industrial Information Committee of the Grinding Wheel Institute has pointed out that unsafe grinding conditions are often produced by re-using grinding wheels on machines of differing diameters for which they were not originally intended. Moreover, inefficient performance and danger to personnel can also result when used grinding wheels are obtained from outside and unknown sources.

T *Pe.138*

Centreless grinding of small notch wheels. Spitzenloses Schleifen von kleinen Zahlrädern

Anon. *Die Maschine* 1961 Vol 15 (6) p 52 (June) (In German)

A new and interesting example of the application of centreless grinding in fields where it was formerly impossible, is the use of this process in the production of small notch wheels, which are of increasing importance in instrument technology. The Wickman-Scrivener centreless grinder using grinding wheels 305 mm in diameter and 50 mm thick has been adapted for this operation. The advantages claimed are exact roundness and a high degree of concentricity.

K *Az Chcc Pr*

Diamond grinding wheels: Explanation of the tentative standard specification (Feb 1961), German Standard 69, 110. Diamond wheels for machining glass in optics; distinguishing features. Diamant-Schleifscheiben. Erläuterungen zum Norm-Entwurf (Feb 1961), DIN 69, 110. Diamantscheiben für die Glasbearbeitung in der Optik; Kennzeichnende Merkmale

H. Nitsche. *DIN Mitteilungen* 1961 Vol 40 (4) pp 205-207 (Apr) (In German)

An attempt has been made to standardise the classification of diamond grinding wheels according to three important features; the bond, the diamond concentration, and the grain size. These features are discussed. 2 ref.

A *Nv.255*

Twelve ways to reduce tool grinding costs

W. H. McNeilly. *Tooling and Prod* 1961 Vol 27 (1) pp 43-45 (Apr)

Due to its performance and resistance to wear, the diamond wheel is said to be the most economical tool for sharpening carbides. Synthetic diamonds are well suited for toolroom grinding. The flaring cup diamond wheel is able to grind a variety of carbide multi-toothed cutters and reamers. A 100-grit, R-grade, 100-concentration, resinoid bonded diamond wheel is generally used for rough grinding. If kept separate from the swarf of silicon carbide or aluminium oxide wheels, the swarf from diamond wheels is valuable for the reclamation of diamond from its contents and from the stubs of worn-out wheels. The use of diamond wheels, therefore, may speed grinding to the point where fewer costly tools are needed in inventory. 2 illustr.

T *Al Bk Chc Nv/Al Bk Chc Nvf*

Increasing the productivity of grinding wheels. Per una migliore produttivita delle mole

G. Mazzi. *G Officina* 1961 Vol 6 (10) p 19 (May 31) (In Italian)

M *Pe.138*

What you should know about wheel grade

R. L. McKee. *Grinding & Finishing* 1961 Vol 7 (4) pp 22-24 (Apr)

A general description of the aspect of the standard wheel marking system relating to grade *ie* hardness. In a wheel marked, say, C36L5V, L refers to the hardness of that wheel. Wheels in the range A to I are regarded as soft, J to P as medium, and Q to Z as hard. Hardness, in this sense, means the strength with which the abrasive is retained by the bond. 3 illustr, 5 ref.

W *Pe Unh.2552*

Revolutionary innovation in the grinding and polishing technique

Anon. *Wire World International* 1961 Vol 3 (1) pp 32-33 (Feb)

A 40 to 60% saving is claimed with the semi-automatic feeding apparatus for liquid grinding and polishing pastes. The apparatus can be applied to any individual place to be polished. 1 illustr.

D *Chc Psz Rdc*

Standard shapes brochure—New American Standard

American Standards Association. *Grinding and Finishing* 1961 Vol 7 (4) p 12 (Apr)

The American Standards Association has approved new standard specifications for shapes and sizes of grinding wheels. The new Standard, B74.2-1960, replaces the prior publication, R45-57.

W *Pe.254.342*

Efficient use of grinding machines

E. F. Tret'iakov. *Der prom* 1960 Vol 9 (11) p 19 (Nov); *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3790 (Mar) (Original in Russian)

X *Chc Pr.21*

Direction and trends of development in precision machining. Stand und Entwicklungsrichtung der Feinbearbeitung

Anon. *Fertigungstechnik u Betrieb* 1961 Vol 11 (5) pp 323-324 (May) (In German)

Amongst the subjects discussed are fine boring and turning, precision grinding, and honing and lapping. Diamond hones for some time have been bonded either by powder metallurgical or electrolytical means. 3 illustr, 2 tables.

M *Ceqz.21/Chh Nqe/Nqe:Lfdz*

De-burring of cast plastic parts. Zum Entgraten von gespritzten Kunststoffteilen

Anon. *Feinw Tech* 1961 Vol 65 (5) p 190 (May) (In German)

A specially constructed Swiss grinder using a belt and liquid polishing agent.

M *Az Bpz Chz Pr*

Grinding and electronic grinding of sintered carbide cutting tools. Schleifen und Elysieren von Hartmetallwerkzeugen

K. Boschert. *TZ für Praktische Metallbearbeitung* 1961 Vol 55 (5) pp 242-245 (May) (In German)

A diamond grinding wheel with a special high conductive metal bond and a porous surface structure is used as a cathode. 9 illustr.

M *Al Bkc Chcr Nv Urc*

The internal grinding of high speed grinding spindles. Das Innenschleifen mit schnellaufenden Schleifspindeln

J. Bergmann. *TZ für Praktische Metallbearbeitung* 1961 Vol 55 (5) pp 237-240 (May) (In German)

7 illustr. *M* *Agp Chcn*

Honing of heading and upsetting dies

G. Haasis. *Wire World International* 1961 Vol 3 (1) pp 21-24 (Feb)

The article describes honing a carbide die, which it says is only done today with electrolytically bonded diamond honing tools. These tools retain their shape extremely well, have a high cutting capacity and long life but can only be used on materials of at least 62RC hardness. For good results using diamond tools high cutting speeds are advised. Horizontal hand-honing machines illustrated are specially designed for this method of operation. Another feature of the machines makes use of the fact that cutting action and the life of the diamond honing shafts can be considerably increased by reversing the direction of rotation of the honing spindle every so often. The article concludes that great accuracy of form can be achieved using a diamond honing tool. 7 illustr.

D *Ax Bk Chh Nqe*

Ultrasonics creates a major innovation in surface grinding

H. W. Bredin. *Machinery, NY* 1961 Vol 67 (8) pp 150-152 (Apr)

Build-up of metal particles can be virtually eliminated, it is claimed by an accessory embodying ultrasonic principles. The system, called Ever Grind, also eliminated wheel dressing on a run which before had necessitated continual re-dressing. 4 illustr.

D *Chcm Pr Psc Vwghb*

Silicon carbide, diamond for grinding carbide ?

A. Rakestraw. *Grinding & Finishing* 1961 Vol 7 (4) p 31 (Apr)

Q: What are the comparative costs of silicon carbide and diamond wheels in carbide grinding ?

A: On roughing, which involves the shank as well as the carbide, green grit SiC wheels average about $7.00/cu inch. Diamond wheels are more satisfactory for finishing the carbide and cost approximately $10.00/cu in., though this has been held as low as $3.50.

W *Bk Chc Nv.145*Bk Chc Pe Rgc.145*

Metalworking report : cutting

Anon. *Amer Mach* 1961 Vol 105 (8) p 3 (Apr 17)

A new automatic external form grinder doubles output and holds very fine tolerances on crowned spherical coupling teeth. Downfeed and wheel dressing are automatic. *W* *Chcz Pr*

East German machine tools at the Leipzig Fair : Naumburg honing machines

R. E. Green. *Machinery, Lond* 1961 Vol 98 (2530) pp 1077-1078 (May 10)

The VEB Werkzeugmaschinenfabrik at Naumburg's vertical honing machine, type SZS 200 by 500E, has a capacity for honing bores from 0.98 to 7.87 in. in diameter, and up to 19.68 in. long. Its honing tool has six diamond-impregnated copper sticks which are expanded hydraulically, under the control of a Massi electro-pneumatic gauging unit. 1 illustr.

T *Chh Nqe Pr*

Fixture simplifies tool bit sharpening

H. E. Piltz. *Tool and Mfg Engr* 1961 Vol 46 (6) p 87 (May)

Tool bits for threading, which are often ground manually, can be surface ground, it is claimed, accurately and in the minimum time with this fixture. 1 illustr. *D* *Al Chc Psc*

New machine for automatic centreless grinding

A. G. Ryzhikova. *Trakt i sel'khozmash* 1960 Vol 30 (12) pp 40-41 (Dec); *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (12) p 3790 (Mar) (Original in Russian)

X *Chcc Prs*

Gear de-burring machine. Zahnrad-Entgratmaschine

Anon. *Industrieblatt* 1961 Vol 61 (5) p 333 (May)

1 illustr. *M* *Ad Chz Pr*

Twist-drill grinder. Spiralbohrer-Schleifmaschine

Horster. *Industr Anzeig* 1961 Vol 83 (45) p 40 (June 6) (In German)

2 illustr. *M* *Albz Chc Pr*

Tracer machine contours to millionths

R. Heslen. *Tool and Mfg Engr* 1961 Vol 46 (6) pp 101-102 (May)

Three different methods of metal removal can be used on the Frauenthal contour tracing machine : (*i*) single-point tools for turning and boring ; (*ii*) a belt driven grinding head using diamond wheels for abrasive metal removal ; (*iii*) a Vonnegutt brush for light abrasive removal to fine finishes. 2 illustr.

D *Cpz Nv Pr*

Vertical external honing machine. Vertikal-Honmaschine zum automatischen Aussenhonen

Anon. *Die Maschine* 1961 Vol 15 (5) pp 36-38 (May) (In German)

1 illustr. *M* *Chh Prs*

Examination of standard values during external-cylindrical cut-off grinding. Richtwertuntersuchungen beim Aussenrund-Einstechschleifen

H. F. Aachen. *Industr-Anzeig* 1961 Vol 83 (35) pp 27-34 (May 2) (In German)

Influence of grinding conditions when cutting-off building steel on depth of surface roughness, grinding wheel wear, total cost of operations is examined, and results are shown in tables and graphs. 22 illustr, 18 ref, 4 tables. *M* *Bfch Cegc Pe.21*

East German Machine Tools at the Leipzig Fair : Optical profile grinding machine

R. E. Green. *Machinery, Lond* 1961 Vol 98 (2529) p 1006 (May 3)

VEB Micromat Dresden have produced a grinding machine that provides for the setting of the carriage by means of gauge blocks, when the work is to be moved in relation to the wheel. For this purpose, dial gauges are also fitted. 1 illustr.
T *Chch Pr Wbby*

SPW Type 1-04 relief grinding attachment

Sueddeutsches Praezisionwerk, KG, Germany, distributed in England by Urquhart Machine Tools, Ltd, London EC 2. *Machinery, Lond* 1961 Vol 98 (2531) pp 1144-1145 (May 17)

This attachment enables relief movements to be obtained in a direction parallel with, as well as at right angles to, the headstock spindle, enabling 2 to 6 flutes to be ground on twist and centre drills as well as on tags and dies. 1 illustr.
D *Al Chc Pr Psc*

Engineering, marine, welding and nuclear energy exhibition April 20 — May 4, Olympia, London

Vacu-Blast Ltd, Wellcroft Rd, Slough, Bucks. *Mach Lloyd* 1961 Vol 33 (8A) p 53 (Apr 22)

A dry honer, with which it is possible to feed fine abrasives down to 600 mesh is said to save space, be easy to operate and cheap to install. 1 illustr.
D *Chh Pr Rdz*

Drill pointer with hopper feed

Winslow Product Engng Corp, Arcadia, Calif. *Machinery, NY* 1961 Vol 67 (9) p 157 (May)

Model 100-C drill point grinder line will accommodate drills ranging in size from No 80 to ½ in. in diameter. The machine is completely automatic in all respects, even to the wheel dressing and compensating operations. It is claimed that drills, sharpened on the ultraprecision point, produce extremely close tolerance holes, eliminating most reaming operations and greatly increase tool life. 1 illustr.
E *Alb Chc Pr*

End-mill sharpening fixture

Harig Mfg Corp, Chicago, Ill. *Machinery, NY* 1961 Vol 67 (9) p 180 (May)

A spindle that floats on a cushion of air is the basis of the Air-Flo, an ultraprecise end-mill and milling cutter sharpening fixture which may be used to sharpen tools from 1/32 in. to 1¼ in. shank capacity sizes.
D *Alc Chc Psc*

The new Roto-Finish-Vibrator, RV 200 and new Roto-Finish chips. Der neue Roto-Finish-Vibrator RV 200 und neue Roto-Finish Schleifkörper

Anon. *Maschinenwelt u Elektrotechnik* 1961 Vol 16 (5) pp 225-226 (May) (In German)

1 illustr.

See also Industr Diam Abstr.

A *Chm Pr Qn Rd*

Tool finisher holds ring wheel in place with Alnico magnets

Leonard Precision Products Co, Grind-R-Lap Div, 9200 Bolsa Ave, Santa Ana, Calif. *Amer Mach* 1961 Vol 105 (9) p 121 (May 1)

The Grind-R-Lap uses alnico magnets in its head to permit quick changing of ring-type wheels for grinding and lapping carbide, HSS, and ceramic tools. The oscillating head moves a diamond grinding wheel that grinds cool and never needs dressing. 1 illustr.
W *Al Chc Nv Pr Psz/Al Chd Nv Pr Psz*

Honing lap

Newtools Inc, Box 1, Amityville, NY. *Amer Mach* 1961 Vol 105 (8) p 170 (Apr 17)

A new handlap, available in four mesh sizes between 180 and 500, is reported to give diamond quality finish for 70% less cost than diamond laps. 1 illustr.
W *Chh Nv*Chh Pg*

Speedlap 12 in. lapper gives flatness to 3 millionths inch

Speedlap Corp, Dept 120, 3636 W Oakton St, Skokie, Ill. *Amer Mach* 1961 Vol 105 (8) p 164 (Apr 17)

The machine uses a Speedalloy reversible lap plate, solid on one side and serrated on the other, and 4 × 4½ in. ID rings. Exceptionally fine finishes are said to be obtained. 1 illustr. *W* *Chd Pr*

Centreless grinding of the bores of bushes. Rettifica senza centri di bussole di foratura

Anon. *G Officina* 1961 Vol 6 (9) p 8 (May 15) (In Italian)

The automatic centreless grinding of the bores of jig bushes on a Wickman-Scrivener centreless jig grinder. 1 illustr. *M* *Az Chcc Prs*

Hydraulic lapping machines. Hydraulische Läppmaschinen

Anon. *Die Maschine* 1961 Vol 15 (5) p 36 (May) (In German)

Machines with two or three laps described which are used for mass production of parts of machine tools, engines, instruments and gauges. 1 illustr.
M *Chd Prx*

Grinding attachment for hard-to-get-at areas

Speedline Sales Co, 12860 Fisk Ave, Warren, Mich. *Tool & Mfg Engr* 1961 Vol 46 (5) p 114 (Apr)

The Diamond Speedgrind attachment is available in various models to fit most surface grinders, with 3/32, ⅛, 3/16 or ¼ in. collets or a mandrel for ¼ or ½ in. ID wheels. 1 illustr. *D* *Chc Nv Pr Psc*

Hone head lengthens tool, stone life

Mid-West Abrasive Co, Machine Tool Div, Owosso, Mich. *Grinding & Finishing* 1961 Vol 7 (4) p 28 (Apr)

A new hone head features reversible wear plates, a body designed to accommodate a number of sizes of expansion bars and wear plates, and the elimination of expansion pins. 1 illustr. *W* *Pgk Uqc*

Machine grinds external crown gears

Gear Grinding Div, Michigan Tool Co, 7171 E McNichols Rd, Detroit 12, Mich. *Tool & Mfg Engr* 1961 Vol 46 (5) p 122 (Apr)

Developed for use on the teeth of spherical gear type couplings, the Model CGG-16 × 18FA crown gear grinder can also be used to grind spur gears and splines. Form templates are used with the hydraulically actuated diamond trimmer to trim wheels for grinding gears with diametral pitches from 64 to 4.
D *Ad Chc Pr Psfbz:Njz*

Circular and bandsaw sharpener

Colton & Co (Lapidaries) Ltd. *Metalworking Prod* 1961 Vol 105 (20) p 89 (May 17)

A new saw sharpener, economic even for small shops, sharpens band saws up to 2 in. wide, and circular saws from 4½ to 40 in. diameter. It can deal with peg, handsaw-cut, and gulleted teeth. An electro-deposited diamond wheel and lubricator can be supplied for topping and facing tungsten carbide-topped saws. 1 illustr. *W* *Alf Chc Nv Pr*

Profile grinder polishes, grinds contours and irregular shapes

Star Cutter Co, PO Box 376, 34500 Grand River Ave, Farmington, Mich. *Amer Mach* 1961 Vol 105 (9) p 134 (May 1); *Grinding & Finishing* 1961 Vol 7 (4) p 49 (Apr)

The Star No 3 features a counterweighted 18 in. diameter worktable accessible from all sides. Parts are moved on the table by hand so as to bring the appropriate work areas into wheel contact. Accessories include a diamond dresser with diamond mounted nib. 1 illustr. *W* *Chch Pr Psf:Nj*

Microhoning generates accuracy and controlled finish in Diesel liner bores

Anon. *Cross-Hatch* 1961 Vol 13 (1) pp 2-4 (Jan, Feb, Mar)

New and worn liners with bore sizes ranging from 4.000 in. to 15.000 in. and up to 42 in. length are regularly being processed in the Mecrome division. Average accuracies claimed are between 0.0006 in. and 0.0008 in. for size, taper and out-of-roundness. 4 illustr. *D* *Chhc*

BP 844,144 **K. Körber**

(Feb 27, 1958—conv date, Germany)

Grinding device for rotary cutter machines

This refers to an automatic grinding device for the cutter blades of tobacco, *etc* cutting machines. The grinding wheel holder moves in a rotary path with the wheel at an eccentric point and the wheel is advanced to a small extent towards the cutter blades on each revolution of the wheel holder. An adjustably mounted diamond keeps the wheel trued by engagement with the wheel at one point of its movement through an arcuate path while the wheel is progressively fed towards the cutter drum. Several wheels may be used moving in a common plane and presented successively to the grinding position. 15 claims, 4 illustr. *J* *Alz Chc Pr:Nj Psf.545*

USP 2,947,121 (Mar 25, 1959) **L. Coes, Norton Co**

Grinding wheel and wheel diameter measuring apparatus

The speed of the grinding wheel is automatically increased by a controlling apparatus responsive to reduction of the wheel diameter. An electric resistance device *eg* a strip resistance or a series of resistors extending in parallel between conductor bars is embedded in the organic resin bonded wheel. A pair of commutators is connected to the resistance device and so arranged that the change of the resistance caused by the wear of the wheel increases the speed of the driving motor. This change occurs in certain increments. Signal devices may be incorporated to indicate to the operator whether the speed is too slow or too fast to enable him to adjust the speed to a desired value. This arrangement is important in modern steel mill practice for conditioning stainless steel slabs and billets on remote control snagging machines. 22 claims, 7 illustr. Ref cited : 2 USP. *J* *Pe Vfd Wbz.545*

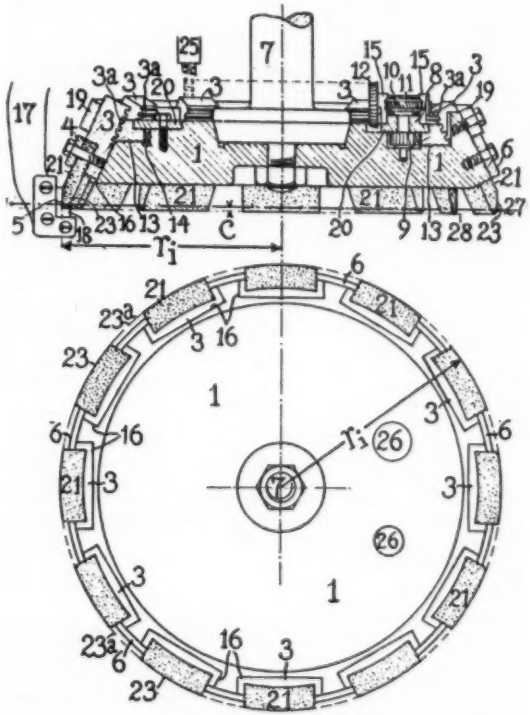
DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 55s 0d, post free.

BP 846,276 (Aug 2, 1956) **J. Inoue**

Gear grinding machines

The grinding wheel disc 1 in Figs 9 and 10 is provided with guide slots 16 cut in the direction of wear of grinding-stones 21. Each slot contains a block 16 retained in the slot by a pressure ring 19 and clamping plates 6. When a ring nut 13 at the back of the disk is rotated all sliding blocks 3 will slide forward and equally and simultaneously move all individual grind-stones 21 so as to compensate for wear. A wheel truing device 18 is shown in Fig 11 to true the stones to their original state as soon as they are moved to compensate for wear. Thus a constant wheel is provided which is of particular usefulness in the gear grinding machine described in BP 846,275. 3 claims, 8 illustr. *J*



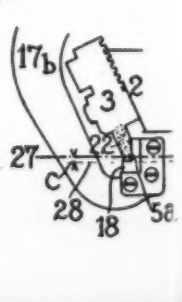


Fig 9 (above), 10 centre), and 11 (below). BP 846,276.

MACHINING PROCESSES AND DEVELOPMENTS

Review of some unconventional methods of machining
F. W. Boulger. *Machinery, NY* 1961 Vol 67 (8) pp 140-146 (Apr)

Describes various electrolytic grinding and electrolytically assisted grinding principles, the latter generally incorporating metal-bonded diamond wheels but other abrasive wheels have been used notably in Russia. 3 illustr, 2 tables. *D* *Chcr Nv.1456*

[Electrolytic drill sharpener]
Connecticut Special Machine Inc. *Tool & Mfg Engr* 1961 Vol 46 (5) p 161 (Apr)

An electrolytic high speed steel drill sharpener makes possible relative combinations of point angle, lip relief angle, and helix angle. The range of geometric angles gives every possible drill point that is practical for drilling metal, fibre, plastics, wood and other allied materials. *D* *Alb Bfcd Chcr Pr.57*

Techniques of ultrasonic machining
A. L. Roses. *Tool & Mfg Engr* 1961 Vol 46 (5) pp 71-75 (Apr)

By applying ultrasonic techniques materials once considered impractical or uneconomical to machine, such as tungsten carbide, hardened tool steels, quartz, ceramics, glass, germanium and many super alloys can now, it is said, be machined. In a practical guide to the application of ultrasonics in precision tooling, the author explains how ultrasonic machines work, their capabilities and how to select tools, toolholders and abrasives. 7 illustr, 2 tables.
D *Ceqr Pr Rd*

The economics of the use of the spark erosion process in the production and preparation of drop forge dies. Wirtschaftlichkeit des Funken-erosions-Verfahrens für die Herstellung und Aufbereitung von Schmiedegesenken
B. Bartkiewicz. *Werkstattstechnik* 1961 Vol 51 (6) pp 324-326 (June) (In German)
7 illustr, 4 ref. *K* *Axz Ceqmb*

Metalworking Report : finishing
Bell Laboratories. *Amer Mach* 1961 Vol 105 (9) p 2 (May 1)

Polishing of silicon and germanium wafers by means of a wheel flooded with an electrolyte produces a finish so fine that roughness cannot be detected under an electron microscope at 53,000 power. The result is a distinct improvement in electrical characteristics.
W *Bfr Chmk Unf/Bhc Chmk Unf*

Some workshop problems. Quelques problèmes d'atelier
M. Mercier. *Mach Mod* 1961 Vol 55 (625) pp 30-31 (Apr) (In French)

The use of spark machining has been found to give very satisfactory results, and to permit the working of particularly resistant materials, such as tungsten carbide. 1 table. *A* *Bkcb Ceqm*

BP 843,548 (Aug 16, 1956) **G. H. Townen, G. K. N. Group Services Ltd**

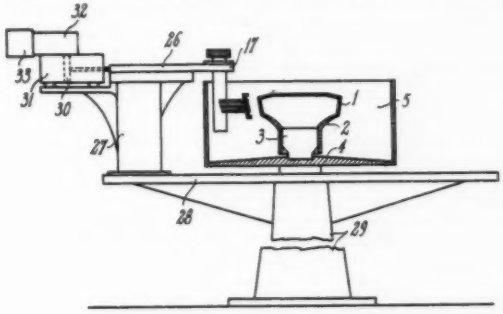
Spark machining apparatus

One of the problems in maintaining a certain spark gap is the necessary accuracy of the feed of the electrode. Lost motion in a gear mechanism has to be eliminated and "stiction" in motor and transmission make it desirable to impose on the movable support a continuous small vibratory displacement all of which increase production costs. The problem has been solved by the use of friction gearing with untoothed transmission faces non-slip rolling contact being maintained by pressure produced by the arrangement of backing members having rolling contact through interposed balls. 7 claims, 3 illustr.
J *Ceqm Pt.545*

FP 1,228,210 (Mar 9, 1959) **SA des Manufactures des Glaces et Produits Chimiques de St-Gobain, Chauny & Cirey**

Method and device for making holes of very small section. Procédé et dispositifs pour la réalisation de perforations de très petite section

The method makes use of a spark machining process especially adapted for making circular holes in metal for the extrusion of plastic filaments or fibres. It is of particular advantage for perforating annular strips



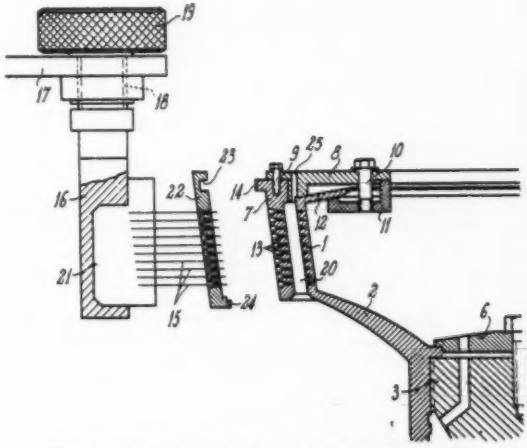


Fig 12 (above), and 13 (below). FP 1,228,210.

forming the periphery of centrifuges for the production of such filaments or fibres. In Figs 12 and 13 strip 1 of centrifuge 2 shown upside down is to be perforated. A crown 7 is secured to the centrifuge having a number of conduits 13. Support 16 carries electrodes 15 in a holder 22. 7 and 22 are preferably made of plastic material and the assembly is radially movable in slideway 26. Container 5 is filled with a dielectric fluid. Blind holes are produced which then are opened by mechanical machining of the interior of the centrifuge. 10 claims, 3 illustr.
J

BP 862,901 Centre National de la Recherche Scientifique (Oct 8, 1956—conv date, France)

Improvements in apparatus for machining by electric spark discharges

Wear of the tool which may exceed 40% in volume of that of the workpiece to be machined results from bombardment of the tool by ions of metal torn away from the workpiece during the beginning of the electrical discharge between the tool and the workpiece. This wear is reduced by causing the impulse of the discharge current to produce a voltage impulse capable of opposing, near the end of the machining discharge, the flow of ions towards the tool.

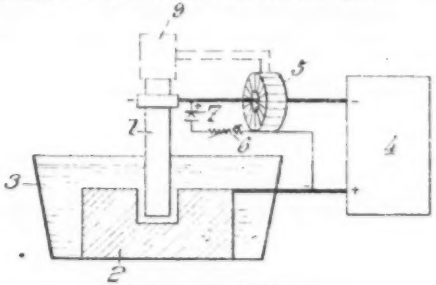


Fig 14. BP 862,901.

The apparatus illustrated in Fig 14 consists of a tool 1 and a workpiece 2 immersed in a dielectric fluid 3 and connected to a spark generating source 4. A winding 5 is provided around one of the conductors extending from the source 4 and forms part of an electric circuit, including a resistor 6 and a rectifier 7, connected in shunt across the terminals of the source 4. Tool and workpiece 2 may be moved away from each other during the end of the discharge by a vibrator 9 controlled from the winding 5. 9 claims, 5 illustr.

H *Ceqm Pr.545*

BP 862,902 Centre National de la Recherche Scientifique (Oct 19, 1956—conv date, France)

Improvements in apparatus for machining a workpiece by electric spark discharges

Intermittent electrical discharges between the tool and the workpiece to be machined is provided by arc energy accumulator (a capacitor) charged periodically by a suitable source. To improve the state of the machined surface while increasing the accuracy and rate of machining a voltage impulse is superimposed, at a given instant of every charging period, on the

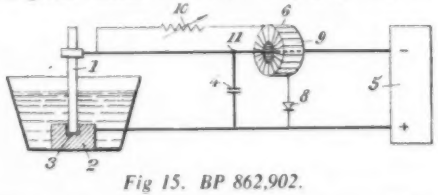


Fig 15. BP 862,902.

voltage applied by the accumulator, between the tool and the workpiece so that a machining discharge is started at that instant which remains the same for all periods. The arrangement shown in Fig 15 comprises a tool 1 and a workpiece 2 separated by dielectric fluid and connected to a capacitor 4 charged from a source 5. A winding 6 is mounted around a conductor extending between the source and one terminal of the capacitor to provide the required impulse. The electrical circuit includes a rectifier 8 and a potentiometer 10. 6 claims, 2 illustr. Ref cited : 1 BP.

H *Ceqm Pr.545*

PRODUCTION, GRADING & RECOVERY OF ABRASIVE PARTICLES

A sedimentation balance, an automatic instrument for particle size analysis. Die Sedimentationswaage, ein automatosches arbeitendes Gerät zur Untersuchung der Korngrössenvertielung

A. Weber. *Ziegelindustrie* 1960 Vol 13 (12) pp 427-431 : H. A. Blasum. *Staub* 1961 Vol 21 (6) p 259 (June 1) (In German)

4 illustr in original. *M* *Vgf W*

Bonded abrasives. Abrasifs agglomérés

G. Winning. *Mach Mod* 1961 Vol 55 (626) pp 53-61 (May) (In French)

The section on abrasives includes a note on diamond, pointing out that this is the hardest of all abrasive substances, that the wheel has only a thin coating of diamond, and that metal or synthetic resin are used for bonding. 4 illustr, 2 tables.

A *Km Nv Ur*

USP 2,947,617 (Jan 6, 1958) **R. H. Wentorf jun, General Electric Co**

Abrasive material and preparation thereof

The common hexagonal form of boron nitride is converted under heat and pressure to cubic boron nitride having an atomic configuration corresponding to that of zincblende (ZnS) of a hardness equal to the hardness of diamond while exhibiting thermal stability superior to presently available abrasive materials. The cubic form is prepared by subjecting the hexagonal boron nitride to a pressure of at least about 50,000 atm at a temperature of at least about 1200° C in the presence of a catalyst selected from the class of alkali metals, alkaline earth metals, lead, antimony, tin and nitrides of these metals. Cutting tools may be made by bonding a crystal of the material to a shank *eg* by the method described in USP 2,570,248 and an abrasive wheel may be made by embedding in its outer portion cubic boron nitride grit in a (melamine-formaldehyde or phenol-formaldehyde) resinous material. 13 claims, 6 illustr. Ref cited : 5 USP ; periodicals.

J *Fg Hpz Re.545/Re.21.545*

TOOL PRODUCTION

Manual on cutting of metals

Anon. *1961 Catalog of Publications* (AM-3) p 8

Book, *Amer Soc Mech Engrs* 1952. Price $10.

Said to give detailed information on tool materials and their treatment, among other aspects.

Not in library of Industrial Diamond Information Bureau. *D* *Bf Ceg.52*

Turning operations on titanium billets

Anon. *Machinery, Lond* 1961 Vol 98 (2523) pp 663-665 (Mar 22)

Carbide tools are said to give the most satisfactory performance in continuous rough turning of titanium. To obtain the best results the tools should be ground with a diamond wheel, without subsequent lapping. 2 illustr, 1 table.

A *Al Bkc Chc Nv/Bfn Ceqb Pdc*

When to use inserted-blade or throw-away milling cutters
F. Gable. *Machinery NY* 1961 Vol 67 (9) pp 99-107 (May)

Results of a recent survey show that inserted-blade type cutters are used more widely than throw-away cutters. The article makes out a case for increasing the applications of throw-away inserts. 11 illustr.
D *Pdcb*

POWDER METALLURGY

Fundamental principles of powder metallurgy
W. D. Jones Pp xii + 1032 1960—London : Edward Arnold (Publishers) Ltd. 147s net ; J. H. Rendall. *Nature, Lond* 1961 Vol 190 (4776) p 572 (May 13)

The book is intended to cover principles rather than practice, and so detailed descriptions of plant and processes are not included. Apart from this, it is claimed to be long, detailed, and very comprehensive. Of special interest is the chapter on sintering.
D *Vwlb.21.52*

Design for the application of ultrasonic energy to metallurgical processes
D. E. Gücer. *Bull Tech University of Istanbul* 1960 Vol 13 (2) pp 69-82 (May) (In English)

Mechanical vibrations have been successfully applied in the fields of ultrasonic drilling, cleaning, flow detection et cetera. An apparatus was designed to study the applications of these phenomena to the liquid sintering of WC-Co compacts in a high temperature hydrogen furnace. Methods for the determination and calculation of dynamic variables connected with the vibration are given. 6 illustr, 2 tables.
D *Bf C Vwghb.21*

Powder metallurgy—a survey
I. Jenkins. *Met Industr* 1961 Vol 98 (19) pp 375-377, 380 (May 12)

Powder metallurgy techniques are outlined including compaction and sintering. General applications are discussed and future trends indicate that with decreasing cost of good quality metal powder sintered products will become more competitive. 3 illustr.
D *Qt.2231/Cql.1451*

Powder metallurgy—a survey
I. Jenkins. *Metal Ind, Lond* 1961 Vol 98 (18) pp 351-354 (May 5)

13 illustr. *T* *Vwlb.2231*

Powder metallurgy in the USSR
American Institute of Mining, Metallurgical and Petroleum Engineers. *AIME Powder Metallurgy Ctte Newsletter* 1961 17 pp (Mar) ; *Brit non-ferr Met Ass* 1961 Vol 41 (382) p 227 (May)

Contains long abstracts of 20 Russian papers or books which have appeared fairly recently.
X *Vwlb.33*

Vibrations and low pressure compacts powder metal
Anon. *Metalworking Prod* 1961 Vol 105 (18) p 50 (May 3)

T *Vwm:Rh*

MISCELLANEOUS

Examination of economical machining. Untersuchung der wirtschaftlichen Fertigung
Anon. *Technik u Betrieb* 1961 Vol 13 (6) pp 81-82 (June) (In German)

Since the actual machining time often accounts for only a small part of the total time involved in carrying out a machining process, it is essential to plan work so as to reduce time spent in unproductive operations to a minimum. *K* *Ceq.1456.21*

Handbook of machine construction for engineers I. Maschinenbau-Handbuch für Ingenieure I
Dubbel. *Buchneuerscheinungen aus den volksdemokratischen Ländern* 1961 (32) p 10 (July 10) (Original in German, Translation in Russian)

Book, SNTL, 912 pp. Price DM 27.
[Not in library of Industrial Diamond Information Bureau]. *K* *Pr.21.322.52*

Ultra high speed and other metal cutting phenomena explored by dimensional analysis
M. Kronenberg. *American Society of Tool and Manufacturing Engineers : Technical Paper, No 331* 1961 Vol 61 (1) 17 pp ; see also *Tool and Mfg Engr* 1961 Vol 46 (6) pp 90-93 (May)

Use of dimensional analysis is encouraged and indicated for a variety of metal cutting processes, including grinding. The Taylor equation is derived by this method as an example. 4 illustr, 8 ref, 4 tables.
D *Bf Ceg Uqfb.21*

German Trade Fair, 1961 : Tools and measuring instruments. Deutsche Industrie-Messe, 1961 : Werkzeuge und Messmittel
Friedl & Co, Vienna 9. *Maschinenwelt u Electrotechnik* 1961 Vol 16 (5) p 191 (May) (In German)

The report mentions the wide range of diamond tools exhibited including truing diamonds, diamond indentors, and diamond files. *A* *N.27.322*

PUBLICATIONS RECEIVED

BOOK REVIEW

Materials and material testing. Werkstoffe u Werkstoffprüfung
A. Frischherz. Verlag Fachbuchring Sedivec & Co, ohg, Vienna. 1960, 173 pp. Price £1 7s 6d

The book is divided into two main parts, the first dealing with materials, the second with material testing. These sections are further subdivided to give a clear and comprehensive survey of the subject, with numerous tables and illustrations. The sub-section on hardness testing discusses the Brinell, Vickers and Rockwell methods, reviews a number of hardness testers, including portable testers, and considers dynamic hardness testing processes.
A *B Cvd Wghc.52/B.52*

LITERATURE REQUESTS
Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

PATENT LISTS

BRITISH

The Official Journal (Patents) 1961 (3768) (May 3)

870,811 FERRANTI METERS LTD, DENIS & EVERITT, E. Mounting of jewels or bearing stones.

870,819 GLEASON WORKS. Machines for generating tooth surfaces of gears and like toothed parts.

870,955 PRECISION GRINDING LTD. Pantographic-engraving machines.

871,184 NATIONAL BROACH & MACHINE CO. Gear-finishing machine.

The Official Journal (Patents) 1961 (3769) (May 10)

871,369 FIRTH BROWN TOOLS LTD, and J. E. STRATFORD. Milling cutters.

871,722 V. LACH, V. POTUKEK, J. SLABA. Method of producing shaped bodies of ceramic material protective against ionizing radiation.

871,398 T. CALOW (trading as CALOW & CO MASCHINENFABRIK UND EISENGIES-SEREI K). Rotary tool head machines for turning bar-stock and the like.

871,577 CARBORUNDUM CO. Ceramic fibre products and method and apparatus for manufacturing thereof.

871,645 GENERAL ELECTRIC CO. Method of converting carbonaceous material to diamond.

The Official Journal (Patents) 1961 (3770) (May 17)

871,964 LANDIS TOOL CO. Centreless grinder.

872,314 E. MURSCHEL & K. MESCHER (trading as SCHEER & CIE, C. F.). Portable grinding machines.

872,225 DANITE HARD METALS LTD. Wire-drawing dies.

872,237 STEEL CO OF CANADA LTD. Wire-drawing die.

872,241 LIDKÖPINGS MEKANISKA VERKSTADS AB. Centreless and other grinding machines.

872,076 CHICAGO PNEUMATIC TOOL CO LTD. Jet rock bit.

The Official Journal (Patents) 1961 (3771) (May 25)

872,811 COMBINED OPTICAL INDUSTRIES LTD. Shaping of lens preforms.

872,599 TSCHERNE, A. Cutting machine.

872,730 KOPPERS GmbH. Two-roller grinding mill.

872,547 JOY MANUFACTURING CO. Rotary-cutting device.

872,901 BROWN INDUSTRIES LTD, DAVID. Milling cutter.

872,613 BROWN INDUSTRIES LTD, DAVID. Milling cutter.

872,921 FIRTH STERLING INC. Spark machining.

872,617 WALSH, R. W. Method of metal drilling by a metal drilling or like machine.

872,618 WALSH, R. W. Metal-drilling or like machines.

The Official Journal (Patents) 1961 (3772) (May 31)

873,132 CHAFFEY, S. J. Polishing or like apparatus for operating on the bores of tubes and the like.

873,133 CHAFFEY, S. J. Polishing or like apparatus suitable for operating on the bores of tubes or on other articles.

873,259 MATERIEL CERAMIQUE MODERNE. Manufacture of ceramic products.

872,965 CORNING GLASS WORKS. Method of making bifocal lenses.

The Official Journal (Patents) 1961 (3773) (June 7)

873,635 ENGINEERING RESEARCH & APPLICATION LTD. Drilling apparatus.

873,741 WINSLOW PRODUCT ENGINEERING CORP. Drill pointer.

UNITED STATES

Official Gazette 1961 Vol 765 (1-4) (Apr)

2,977,724 W. J. KENNEDY, S. F. HOSTETLER, TEXTRON INC. Lens surfacing machine.

2,977,726 D. W. DANIEL, NATIONAL BROACH & MACHINE CO. Gear honing tool.

2,977,822 H. A. HAMBERGER, C. M. ERNISSEE, HAMCO MACHINES. Automatic saw sharpener.

2,977,828 R. M. STRICKLAND, UNITED GREENFIELD CORP. Carbide drill.

2,978,043 D. M. COWAN, JOY MANUFACTURING CO. Rotary rock drill.

2,978,049 S. C. SKIDMORE, F. B. CROOK. Stablizer for drill bit.

2,978,843 F. E. BIRTCH, B. H. JOHNSON, MICHIGAN TOOL CO. Apparatus for grinding double-enveloping worm elements.

2,978,844 M. UMEDA, TOYO KOGYO CO, LTD. Vibrating internal grinding machine.

2,978,847 H. SCHOENMAKERS, NORTTI AMERICAN PHILIPS CO INC. Abrasive cutting wheel.

2,979,867 E. J. BEAVER. Grinder and attachment therefor.

2,979,868 R. EMEIS, SIEMENS-SCHUCHERTWERKE ALSTIENGESELLSCHAFT. Lapping device for semi-conductor wafers.

2,979,869 S. R. BIRLESON, H. H. CAMPBELL, H. R. DOBB, THE KAYDON ENGINEERING CORP. Control system for grinding machines.

2,979,870 H. POLLARD, C. S. YINGST, THE HEALD MACHINE CO. Grinding machine.

2,979,974 D. CRAIG. Boring tool.

2,979,993 F. U. HEDSTRÖM, SANDVILSENS JERNVERGS ALSTIEBOLAG. Rock drill bit and method of manufacturing same.

2,980,524 J. S. MORTON, ENGIS EQUIPMENT CO. Abrasive compositions.

2,981,037 C. J. TERP, BRYANT CHUCKING GRINDER CO. Worlsholder and method for internal grinding.

2,981,248 S. A. MATTSSON, A. V. KARLSSON, SKANDINAVISLIA GRANIT ALSTIEBOLAGET. Saw blades for stone sawing machines provided with hard metal cutters.

2,981,610 J. S. LARKINS, ELOX CORP. Electrical machining apparatus.

SOUTH AFRICA

Official Journal 1961 Vol 14 (13-16) (Mar-Apr)

59/3776 A. C. HELWIG, A. LANGENBERG, L. M. L. G. LEBLANS, PHILIPS' GLOEILAMPEN-FABRIKEN. Methods of manufacturing articles provided with a diamond, in particular, gramophone needles.

60/5047 B. ELLIOTT, J. EVANS, HIGHER SPEED METALS LTD. Cutting tools.

60/5064 R. D. ZIMMERMAN, G. F. SHIPMAN, INGERSOLL-RAND CO. Drill bit.

60/5227 N. G. A. HAGSTRÖM, SANDVILSENS JERNVERKS ALSTIEBOLAG. Cutting insert for percussion drill bits.

AUSTRALIAN

Official Journal 1961 Vol 31 (10-11) (Mar)

232,894 UNITED STATES STEEL CORP. Controlling sintering.

232,940 CHEMICAL RESEARCH CORP. Abrasive products.

232,995 NORTON CO. Coated abrasive sheet.

FRENCH

Bulletin Officiel 1961 Vol 2 (14-17) (Apr)

1,257,912 J. PARKINSON & SON, LTD. Machine for forming or finishing gear teeth.

1,257,875 ANOCUT ENGINEERING CO. Method and apparatus for electrolytic forming of metals and metalloids.

1,257,770 SOCIÉTÉ ANONYME SOMATA. Abrasive material and preparation thereof.

1,258,694 A. FABRE. Saw blades for sawing mineral blocks.

1,258,480 JERSEY PRODUCTION RESEARCH CO. Bore drill assembly.

1,259,317 B. ELLIOTT & CO LTD. Surface grinding machine.

1,259,428 R. FAURE. Finishing machine for tubes and rods.

1,259,435 P. C. DURAND. Machine for grinding thin plates for examining solid bodies under the microscope.

INDUSTRIAL DIAMOND PUBLICATIONS

NAG PRESS LTD, 226 Latymer Court, Hammersmith, London, W6. (RIVerside 2143).

DIAMOND TECHNOLOGY. Production Methods for Diamond and Gemstone, by P. GRODZINSKI. First published, 1942. 2nd edition, 1953, 840 pp, 486 illustr, 94 tables, indexes, price 55s od.

MICROSTRUCTURES OF DIAMOND SURFACES, by S. TOLANSKY, F.R.S. 67 pp, illustr, bibl. 1955. Price 40s.

SIX YEARS' INDEX—to *Industrial Diamond Review*, reviewing carefully the contents of the first six volumes of this journal, 1940-46, thus making the contents easily available for specialist research. 1948. Price 3s.

DIAMOND TOOLS, by P. GRODZINSKI. Comprehensive book, reviewing all industrial applications of diamond. 1944. Price 20s, by post 20s 9d.

MANUFACTURE OF DIAMOND TOOLS AND THEIR APPLICATION IN GERMANY—reprint from a series of articles in *Industrial Diamond Review*, reviewing the German diamond industry; based on Government Reports and Technical Literature. 28 illustr, 15 tables. July, 1948. Price 7s 6d.

IDR REPRINT SERVICE. 12 pp. 7¾ by 7⅝ in. List of reprints available. Classified, authors' index, subject index of groups. September 1958. Free of charge. Reprints 1s each, post free.

A CONTRIBUTION TO THE HISTORY OF GRINDING, by F. M. FELDHAUS. 18 pp, illustr, bibl. 1953. Price 3s 6d.

GENERAL NOTES

The Industrial Diamond Information Bureau is included in the Diamond Research Organization of Industrial Distributors (Sales) Ltd (incorporated in the Union of South Africa), together with the Diamond Research Laboratory in Johannesburg.

Abstracts

The Bureau prepares abstracts of current scientific and technical literature, including patents, on industrial diamonds and associated subjects. These are published monthly in *Industrial Diamond Abstracts*, which is supplied free to those concerned with the use of diamonds for industrial purposes, and to specialist libraries. The publishers do not claim any copyright in respect of abstracts in this journal. No specific acknowledgement is made to other abstract journals, and no objection will be made to other abstract journals using the contents.

The list of journals (latest issue, September 1955) from which *Industrial Diamond Abstracts* is compiled will be supplied on request.

Library

The Bureau has a Reference Library which seeks to cover world literature on the application and production of diamond tools. It is kept up to date by a careful examination of new publications announced in abstract and technical journals, and covers, in addition to English, German, French and Russian books. The library specializes in technical and scientific pamphlets.

Patent Abstracts

Patent lists are prepared from official patent journals of the major industrial countries, and patent abstracts in general from the printed patent specifications. Printed copies of British patent specifications accepted may be obtained from the Patent Office, Southampton Buildings, London WC 2, at 3s 6d each. Numbers given under British applications for patents are for reference in all correspondence up to acceptance of the complete specification.

The following abbreviations are used :—BP for British Patent, USP for United States Patent, DAS for German Patent Application, DBP for German Patent (GP for German Patents issued prior to 1950), FP for French Patent, Canad P for Canadian Patent, and RP for Russian Patent.

Supply of Literature

1. **Loan Service :** much of the literature abstracted in this journal is available in its original form, and can be borrowed for a period of fourteen days (in Great Britain only). When applying for a loan, please quote the title of the article, the name of the author, and the number of the page on which it appeared. *Do not quote* the coding at the end of an abstract as this is for internal reference only.

2. **Reprints :** copies of certain selected articles on industrial applications of diamond are available and can be supplied on request at a charge of 1s each, post free. New reprints are announced from time to time in this journal, and a classified list of reprints, dated September 1958, is available free on request.

Technical Information

The Bureau offers the resources of its considerable literature holdings to those seeking specific information on diamond tool and similar applications. Problems requiring fuller technical assistance can be referred to the Diamond Research Laboratory, Johannesburg.

Inquiries in connexion with these services should be made to Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd, 2 Charterhouse Street, London EC 1.

INDUSTRIAL DIAMOND INFORMATION BUREAU

Industrial Distributors (Sales) Ltd, 2 Charterhouse Street, London, EC 1.

LIST OF PUBLICATIONS, JULY, 1961

For information on industrial diamonds contact the Industrial Diamond Information Bureau. Backed by the Diamond Research Laboratory in Johannesburg (the largest laboratory in the world devoted to diamond technology), the Bureau offers information and advice without obligation. Please write to the above address.

***INDUSTRIAL DIAMOND ABSTRACTS:** issued monthly, from 1944 onwards, about 20 pp, 7⅞ x 9¾ in. Surveys technical, scientific, and patent literature.

***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅞ x 9¼ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the library.

***IDR REPRINT SERVICE :** Classified, authors' index, subject index of groups, 12 pp, 7⅞ x 9¾ in., Sep 1958. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** 16 pp, illustr, 11 x 9 in. Rev ed, 1956.

SELECTED BIBLIOGRAPHIES:

* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅞ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅞ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

Hardness and hardness testing (from 1937 to 1955). 118 pp, name index, subject index, 7⅞ x 9¾ in. 1955-56. Price 5s 6d.

DIAMOND TOOL PATENTS (Patent Monographs)

IA: Machining metals and non-metallic substances, by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅞ x 9¾ in. Apr 1949. Price 10s.

II, IIs: Diamond abrasive wheels, by P. Grodzinski. 74 pp, 4 tables, name index, 7⅞ x 9¾ in. Aug 1948/49. Price 13s 6d.

III, IIIs: Truing of grinding wheels, by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅞ x 9¾ in. Dec 1948/49. Price £1.

IV: Polishing of gem diamonds, by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅞ x 9¾ in. December, 1950. Price 12s 6d.

THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR, by W. F. Cotty. 18 pp, illustr, 7⅞ x 9¾ in. Oct 1956. Price 2s 6d.

---

* *Publication free of charge.*

The Hands of the Craftsman . . .

on the craftsman-built

HABIT

DIAMOND POLISHING MILL

Built to satisfy the exacting demands of the 'HABIT' Diamond Polishing Staff, the HABIT MILL is now available to Industry.

The Habit mill embodies every essential feature for efficient diamond polishing that experienced craftsmen could envisage. Designed to provide an absolutely flat, vibration-free working surface enabling mechanical dops and either simple or complex fixtures to be employed. The internationally famous De Winter Scaife has been fitted, which does not require balancing and which is always parallel to the table to within 002" (0.05 mm).

There are no installation costs—simply plug in to the power supply and start work

★ *Look for the Little Flag!*

Further details on request :

HABIT DIAMOND TOOLING LTD
LURGAN AVENUE . LONDON . W.6
Telephone: FULHAM 7944

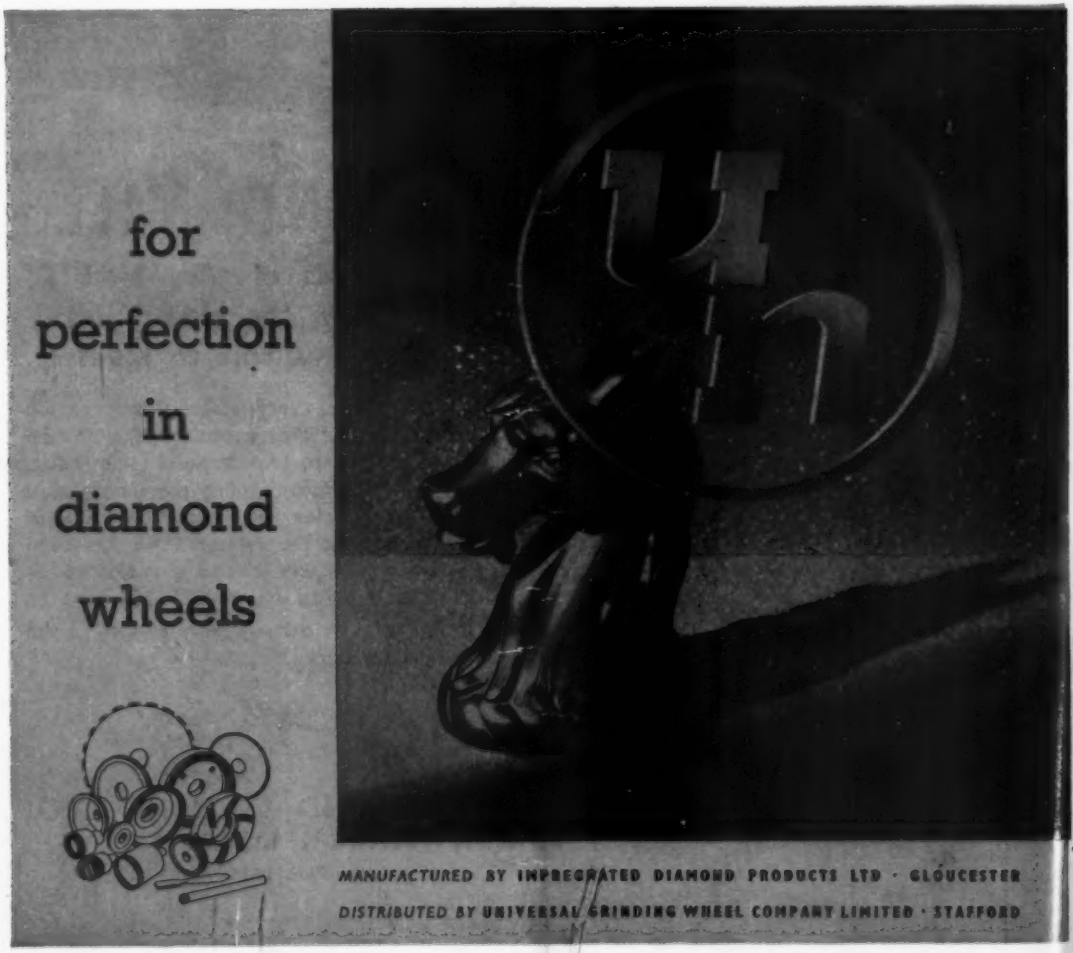
a journal for precision engineers and all users of industrial diamonds and other hard materials

INDUSTRIAL DIAMOND REVIEW

incorporating INDUSTRIAL DIAMOND ABSTRACTS

MONTHLY 1/3 SUBSCRIPTION 15/- A YEAR

July, 1961 Vol. 21 No. 248


for perfection in diamond wheels
MANUFACTURED BY IMPREGNATED DIAMOND PRODUCTS LTD · GLOUCESTER
DISTRIBUTED BY UNIVERSAL GRINDING WHEEL COMPANY LIMITED · STAFFORD